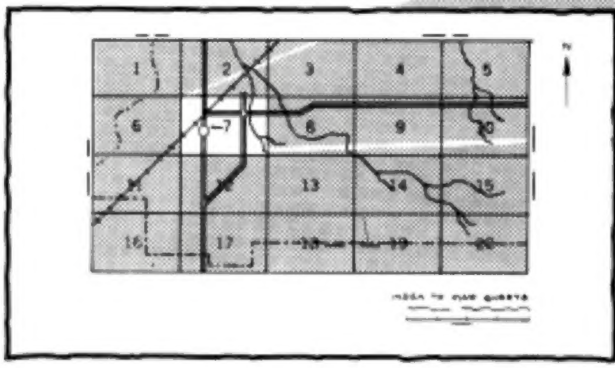
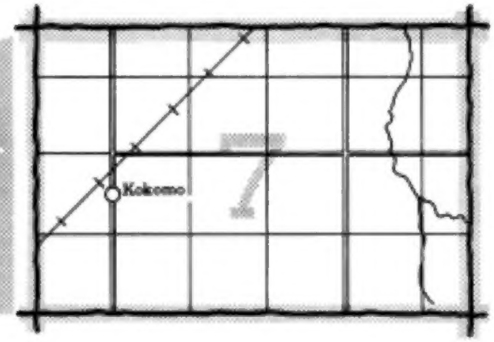
Soil survey of WHITE COUNTY ARKANSAS

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Arkansas Agricultural Experiment Station

HOW TO USE

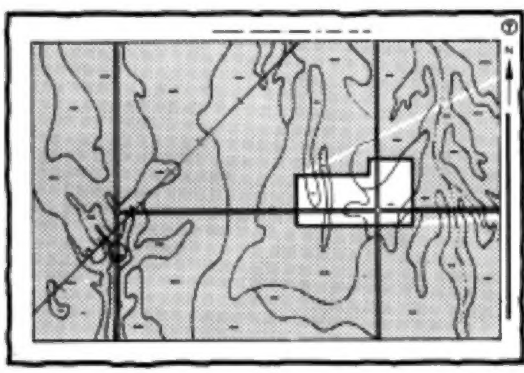
1. Locate your area of interest on the "Index to Map Sheets"

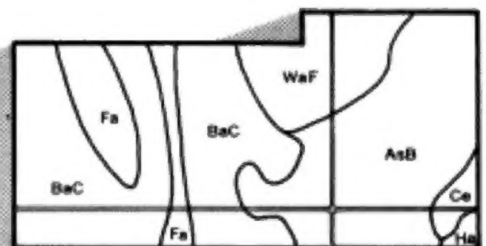




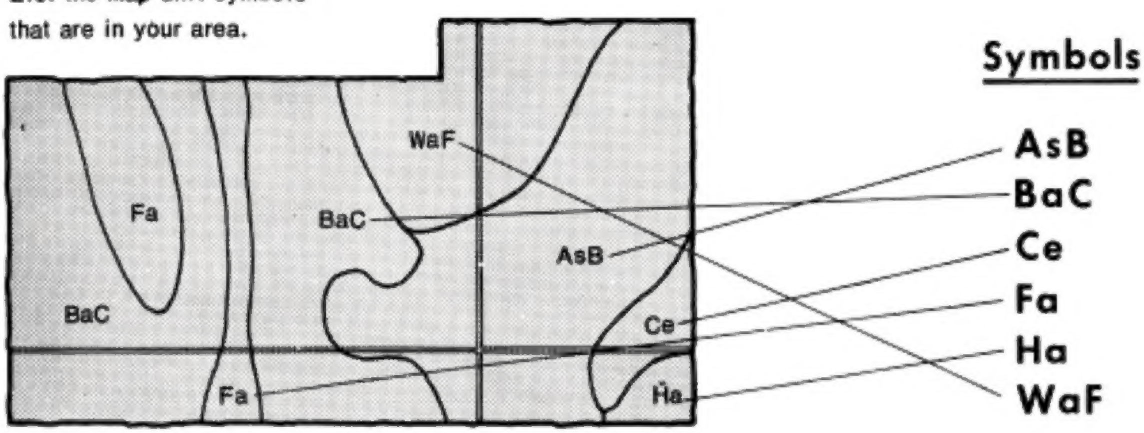
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



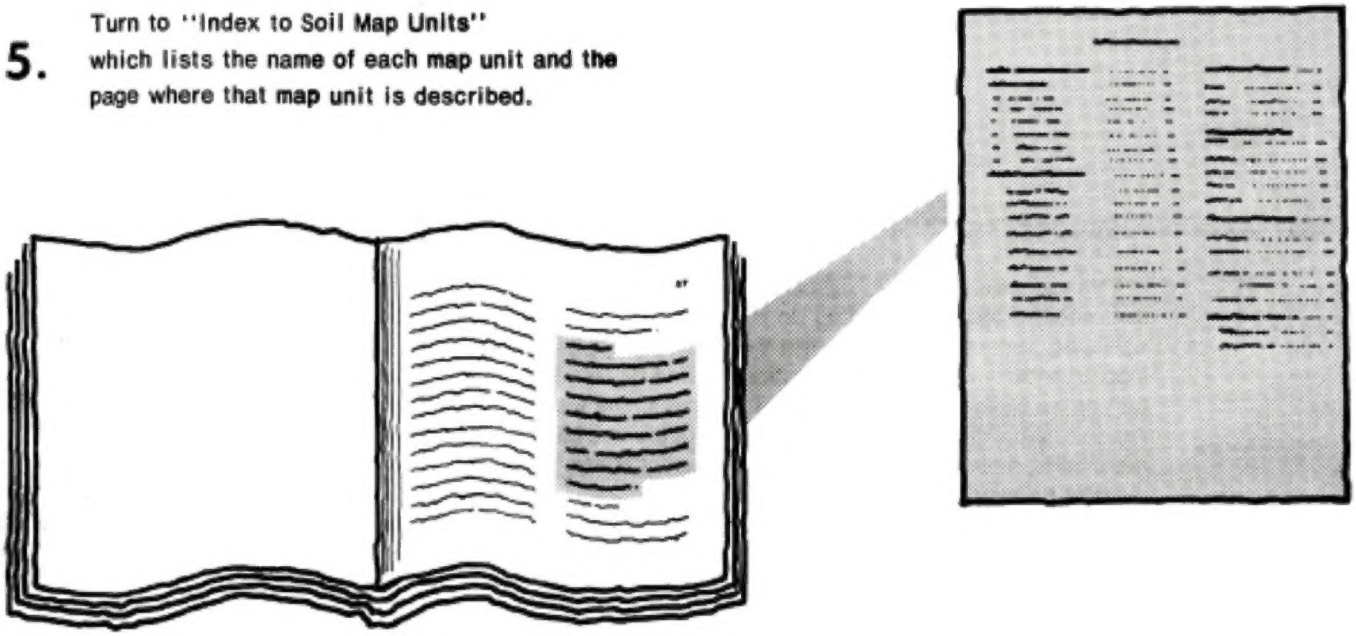


4. List the map unit symbols that are in your area.

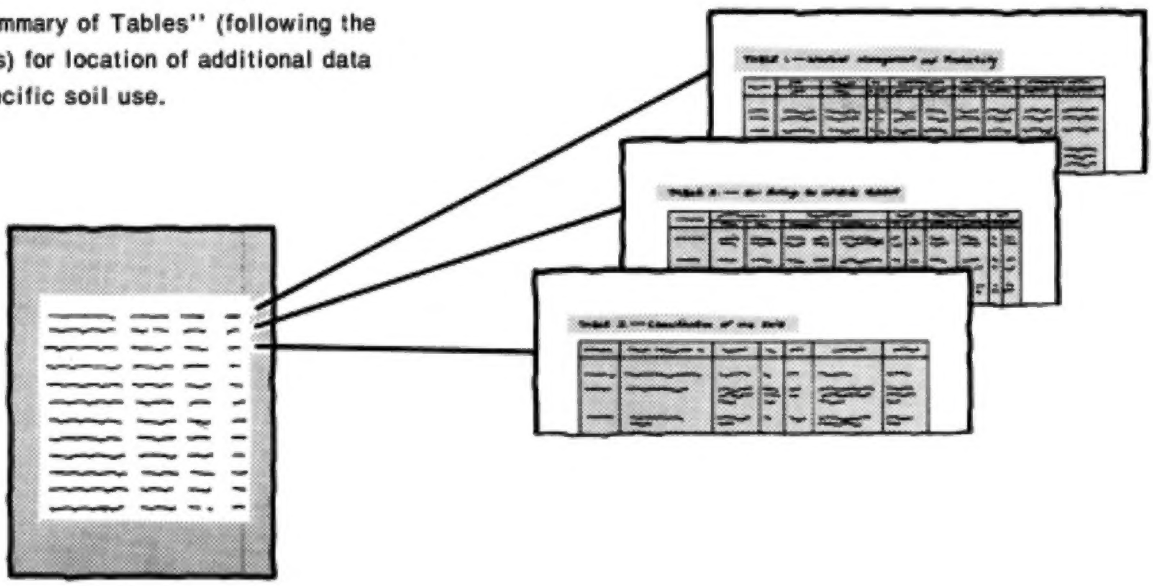


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1974-1979. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the White County Conservation District.

Cover: Strawberries on Linker fine sandy loam, 3 to 8 percent slopes.

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soil series

Issued December 1981

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foreword

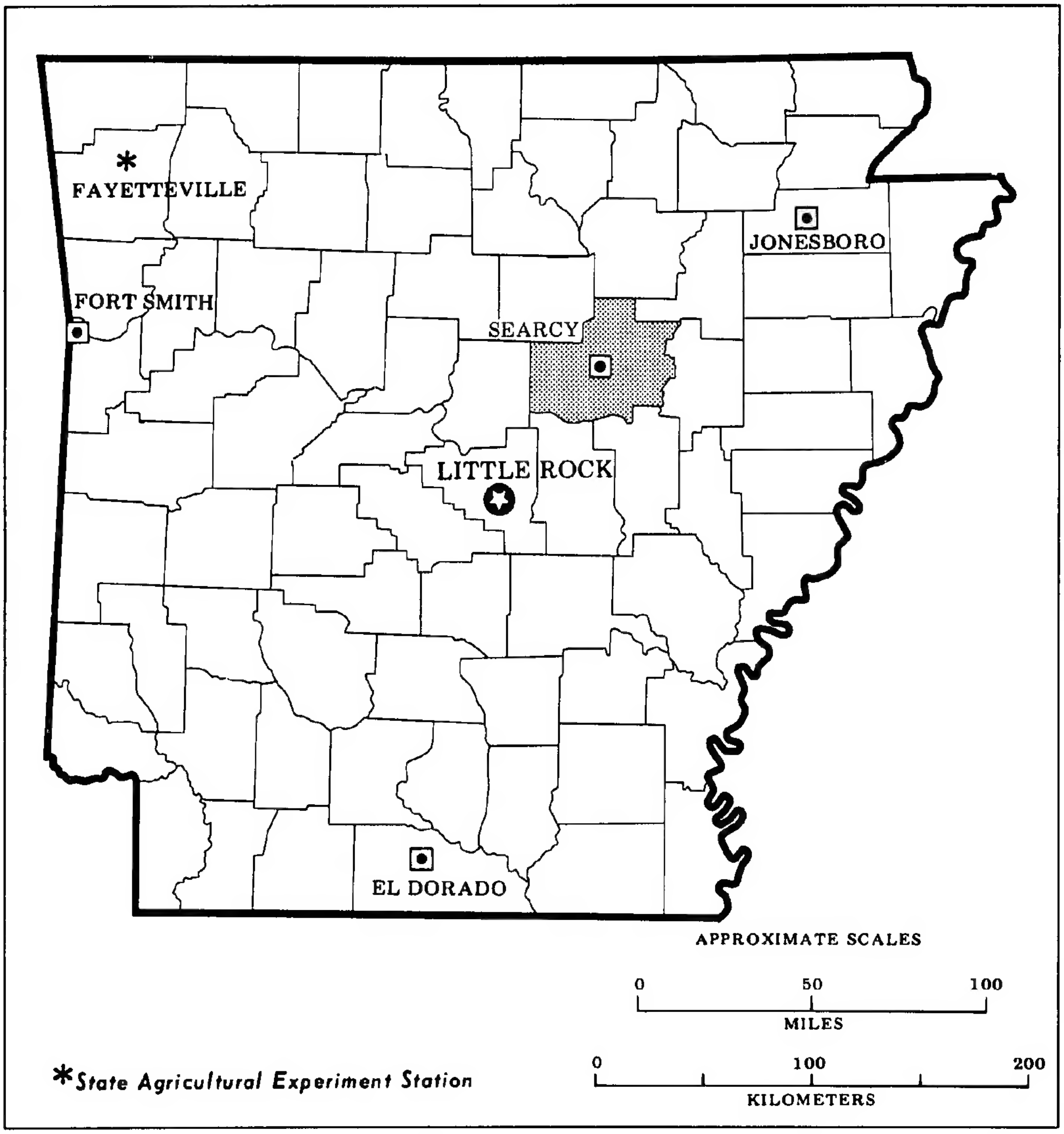
This soil survey contains information that can be used in land-planning programs in White County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Jack C. Davis
State Conservationist
Soil Conservation Service



Location of White County in Arkansas.

soil survey of
White County, Arkansas

by Warren A. Gore and Cornelius Harris
Soil Conservation Service

United States Department of Agriculture
Soil Conservation Service
in cooperation with the
Arkansas Agricultural Experiment Station

White County is in central Arkansas. It is irregular in shape and ranges from about 12 to 42 miles from east to west and 20 to 35 miles from north to south. The county is bounded on the east by Woodruff and Prairie Counties and on the south by Prairie and Lonoke Counties. Faulkner and Cleburne Counties are to the west and Cleburne, Independence, and Jackson Counties are to the north. The White River forms most of the county boundary on the east side, and Cypress Bayou forms most of the county boundary on the south side. According to United States Census reports, the approximate land area is 666,496 acres, or about 1,041 square miles. In addition to this there are 1,024 acres of large water area. The total area is about 667,520 acres.

In 1970 the population was about 39,253. Searcy, the county seat and main trading center, had a population of 9,049. Beebe, the next largest town, had a population of 2,849. Other smaller trading centers where farm marketing facilities are available and small factories are located, are Bald Knob, Judsonia, and Rose Bud. Except for the small industries in Searcy and Bald Knob, the economy is based on farming and farm-related enterprises. About 50 percent of the total productive income is derived from farm related sources.

general nature of the county

This section describes farming, physiography, drainage, water supply, and climate in White County. Statistics in the discussion of farming are from the 1974 Census of Agriculture.

Roughly 40 percent of the county, on the eastern part, is alluvial and eolian material from within the Mississippi Basin. The soils contain moderate to high amounts of plant nutrients. The topography of the area is generally level except for a few low rises, short escarpments, and sides of stream valleys. The flood plain of the White River and its tributaries is inundated frequently during the winter and spring, but this does not prevent the growing of warm-season crops. Restricted surface drainage is the main limitation in the remainder of the area, although erosion is a problem in a few sloping areas. Most of this eastern part of the county is used for field crop production.

The western part of the county is material weathered from sandstone, siltstone, and shale. The soils are generally low in plant nutrients. The topography of the area is undulating valleys with rolling or steep sides of ridges and undulating or rolling ridgetop divides. About 85 percent of the acreage is suitable either for cultivation or for improved pasture, but the hazard of erosion is moderate to very severe except on minor areas of soil. The remaining acreage is valleys and ridges too steep or too stony for intensive use. Most of the livestock production in White County is in this area. Some of the broader valleys are used extensively for field crops.

farming

Farming in White County began on soils with good natural drainage, on natural levees above the flood plains of the rivers and creeks, and on the hills in the western part of the county. Cotton was the main cash crop. Strawberries, which constituted another important cash crop, were grown extensively in the vicinity of Bald Knob. Unless too steep or too stony, most of the better

drained soils were cleared for these purposes. The steep, stony, or wetter soils were left in woodland.

Farming has changed to make the type of farm operation more compatible with the soil. The once-cultivated hilly soils developed in residuum, are low in plant nutrients and are farmed less intensively. Here forage crops—mainly pasture or hay and pine plantings—have entirely replaced cotton, but a strawberry crop is still produced on an increasingly small acreage of the Bald Knob area. Soybeans and grain sorghum are grown on some of the less sloping plateaus and valleys. Beef cattle, dairy cattle, poultry, swine, truck crops, and timber provide most of the farm income. About 53 percent of the farm operators work more than 100 days off the farm, and most are in this hilly area.

Most of the soils on bottom lands and terraces have moderate to high amounts of plant nutrients, and some are among the most productive in the county. The soils are generally level or nearly level, and most have been cleared for cultivated field crops. Except for the upper part of the bottom lands along the Little Red River, protected by Greers Ferry Dam, the bottom lands are flooded during the winter and spring. The main crop here is soybeans. About 16,000 acres is in the Hurricane Lake Game Management Area and remains in woodland. Bottom lands within the lower reaches of Bayou Des Arc, Bull Creek, Cane Creek, and Cypress Creek have been partially cleared. Soybeans is the main crop in this area.

The most intensively farmed soils are the soils on terraces, most of which formed in windblown material high in content of silt. Most of the prime farmland is in this area. The main crops are soybeans, rice, wheat, and grain sorghum. A few farmers keep herds of beef cattle or dairy cattle. Fish farming and poultry production are other enterprises on some farms. On many farms the drainage has been improved for more reliable crop production.

About 63 percent of the White County land area is in farms. Between 1969 and 1974, the number of farms decreased from 2,024 to 1,788 and the acreage in farms decreased from 428,631 to 420,487 acres. The size of the average farm increased from 212 to 236 acres; however, the 1,000- to 1,999-acre farms increased in number during this period. The number of smaller farms decreased. Most of the farms are small enough that the operator's family, with occasional outside help in peak seasons, can do the work. Most farms have sufficient modern equipment for efficient management.

The main industrial enterprises that are related to agriculture are saw mills, feed mills, grain elevators and driers, egg processors, and small slaughter houses. There are several roadside stands for selling fresh fruits and vegetables, and there are collection points for moving vegetables to processors outside the county. The University of Arkansas operates a small fruit experiment substation near Bald Knob.

physiography and drainage

The White River is a graded stream with a well defined channel flowing southward along the eastern side of the county. The flow is regulated by major flood control impoundments upstream from White County. It is open to barge traffic the year round. This river, along with its many oxbow lakes, also provides recreation in the form of boating, fishing, and hunting. It yields sand and gravel in quantities large enough to be profitably dredged. Fish and mussels are sometimes removed in commercial quantities. With the exception of about 34,070 acres in Cadron Creek Watershed, all the stream watersheds in White County eventually drain into this river.

The flood plain along White River is generally flat except for a few undulating areas in riverbends. Slopes seldom exceed 1 percent except on the sides of former river channels, which provide most of the surface drainage in the area. Elevation on these bottom lands ranges from about 180 feet near the Prairie County line to about 210 feet near the Jackson County line.

The soils formed in loamy and clayey material on the flood plain of White River are generally high in natural fertility. The material is a mixture of minerals from the Mississippi River Basin. It is derived from many kinds of soils, weathered rock materials, and unconsolidated materials that came from more than 24 states. Commerce, Kobel, and Robinsonville soils are the major soils that formed in these materials along the White River flood plain.

Flooding occurs sometime during the winter or spring almost every year along White River and its tributaries, which are influenced by the rise and fall of White River. The surface water drains from the area through artificial drains and the natural drains that follow the course of former river channels. There is a good supply of ground water for irrigation.

Between the bottom lands along White River and the valleys and ridges to the west is a level to gently sloping terrace formed by the actions of wind and water. Calhoun, Calloway, and Loring soils formed in the windblown material; Jackport and Gore soils formed in the waterborne material; and Crowley soils formed in both. Generally these soils are moderate in fertility. Elevation on this terrace ranges from about 190 feet in the southeast part of the county to about 250 feet in the vicinity of Beebe. This terrace is generally level except where it is broken by streams flowing from the ridges and valleys to the west. The soils on valley walls and escarpments along these streams have slopes of 1 to 8 percent. Surface water leaves the area through shallow, sluggish, intermittent streams and draws leading off the level areas into Oats Creek, Glaise Creek, Big Mingo Creek, Overflow Creek, Little Red River, Cane Creek, Bull Creek, Cypress Bayou, and Des Arc Bayou, all of which empty into White River.

The widespread use of ground water—primarily for rice production—has resulted in the drilling of about 800

irrigation wells in this part of the county. Most of these provide adequate water for the intended use. In an area north of Little Red River, however, some of the wells have yielded water with a high content of salts. A few farms use streams or reservoirs as a source of irrigation water. Ground water for home use is ample.

The western part of White County consists of valleys and ridges. In this area steep, stony ridges rise from the terraces to the east. They rise 100 feet to more than 250 feet in less than 2 miles to become the nearly level to rolling ridgetops that form the drainage divides between tributaries to the streams leaving the area. A few of the ridges in the southern part of the area are narrow.

Elevation ranges from about 200 feet on the flood plain of Little Red River near Searcy to about 672 feet on top of Mount Pisgah, about 2 miles southwest of Letona. Surface water falls as much as 500 feet before reaching the levels of the major drainageways. Slopes generally range from 0 to 8 percent in the valleys, 8 to 30 percent on the sides of ridges, and 3 to 12 percent on ridgetops.

Soils of the valleys and ridges formed mainly in material weathered form local sandstone, siltstone, and shale. They are generally low in fertility. Linker, Sidon, Nauvoo, and some of the Steprock soils formed in residual material on the nearly level to rolling ridgetops. Steprock and Enders soils formed in residual material on the sides of the ridges. Leadvale, Taft, and Guthrie soils formed in colluvial and alluvial sediments washed from soils at the higher elevations. Barling, Spadra, Rexor, and Nugent soils formed in alluvial sediments along the drainageways in the area.

The northern part of the valley and ridge area is drained mostly by Glaise Creek, Overflow Creek, or Little Red River and its tributaries. The major tributaries to Little Red River are Big Creek, Little Creek, Fourteen Mile Creek, Ten Mile Creek, and Panther Creek. The southern part of the area is drained mostly by Des Arc and Cypress Bayous and their tributaries—Bull Creek, Cane Creek, and White Oak Creek. This drainage system flows into White River except for a small area drained by tributaries of Cadron Creek, which eventually flows into the Arkansas River.

There is insufficient ground water for irrigation purposes, and in some places it is insufficient for home use. Wells for home use generally yield less than 50 gallons per minute. Well water is commonly a calcium sulfate type, is high in iron, and is hard. Livestock water is supplied by creeks and farm ponds.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

White County is hot in summer, especially at low elevations, and moderately cool in winter, especially on mountains and high hills. Rainfall is fairly heavy and well distributed throughout the year. Snow falls nearly every winter, but snow cover lasts but a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Searcy, Arkansas in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 42 degrees F, and the average daily minimum temperature is 31 degrees. The lowest temperature on record, which occurred at Searcy on February 2, 1951, is -10 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 92 degrees. The highest recorded temperature, which occurred on July 13, 1954, is 112 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 51 inches. Of this, 26 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 5.96 inches at Searcy on January 30, 1969. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 4 inches. The greatest snow depth at any one time during the period of record was 10 inches. On an average of 3 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to

nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their potential for major land uses. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, pasture, woodland, and urban uses.* Cultivated crops are those grown extensively in the survey area. Pasture crops are those grown for livestock forage production. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments.

soil descriptions

Areas dominated by deep, level soils formed in alluvial material; on flood plains

The map units in this group make up about 15 percent of White County. This group is mainly in the southern and eastern parts of the county. The more narrow areas extend diagonally northwest into the uplands to the west.

1. Kobel-Commerce

Poorly drained and somewhat poorly drained, level, clayey and loamy soils; on bottom lands of the White River

This map unit is in the eastern part of the county in backswamp slack water areas, on allvuial plains, and on natural levees. The dominantly level landscape is broken by oxbow lakes and sloughs. Most of the surface water leaves this unit through abandoned channels of the meandering White River. The soils in this unit formed in clayey and loamy alluvium.

This map unit covers about 8 percent of White County. About 80 percent of the unit is Kobel soils, 15 percent is Commerce soils, and the remaining 5 percent is minor soils and water areas.

The poorly drained Kobel soils are in backswamp slack water areas. They have a dark grayish brown, silty clay surface layer, and a gray, and dark gray, mottled, silty clay subsoil. The somewhat poorly drained Commerce soils are on alluvial plains and natural levees. They have a surface layer of brown silty clay loam; a subsoil of grayish brown and dark grayish brown, mottled silty clay loam; and underlying material of dark gray silty clay. Both soils are frequently flooded during the winter and spring.

The minor soils in this map unit are in the Robinsonville, Oaklimeter, Tichnor, and Jackport series. The well drained Robinsonville soils are on natural levees close to drainageways. The moderately well drained Oaklimeter soils and the poorly drained Tichnor soils are both on flood plains of tributaries to the White River. The poorly drained Jackport soils are on adjacent terraces.

Except for small patches of hardwood trees, most of the areas in this unit that are under individual ownership are cultivated. About 16,000 acres is a state-owned game management area that is dominantly woodland and areas of water. None of this unit has urban use.

The soils in this unit are poorly suited to cultivated crops and only crops that have a short growing season can be safely grown. These soils are moderately suited to pasture. Flooding is the main limitation for crops and pasture. These soils are well suited to woodland, but wetness and flooding are severe limitations to the use of equipment. The soils in this unit are poorly suited to most urban uses because of flooding and wetness. The very high shrink-swell potential of Kobel soils is a further limitation to urban uses. These limitations are impractical to overcome without major flood control measures.

2. Tichnor-Oaklimeter

Poorly drained and moderately well drained, level, loamy soils; on bottom lands of streams that drain uplands

This map unit is along Cypress Bayou and Raft Creek and their major tributaries in the southern part of the county. These soils are on backswamps and natural levees. The meandering streams have left a braided network of abandoned channels throughout the dominantly level landscape. Most of the surface water collects in these shallow channels and slowly flows to the main streams. These soils formed in loamy alluvium.

This map unit covers about 5 percent of White County. About 65 percent of the unit is Tichnor soils, 25 percent is Oaklimeter soils, and the remaining 10 percent is minor soils.

The poorly drained Tichnor soils are in backswamps between adjacent terraces and natural levees. They have a grayish brown, mottled, silt loam surface layer; light gray, mottled, silt loam subsurface layer; and gray, mottled, silty clay loam subsoil. The moderately well drained Oaklimeter soils are on the natural levees closer to stream channels. They have a surface layer of brown silt loam and a subsoil of brown, yellowish brown, and gray, mottled silt loam. Both soils are frequently flooded during the winter and spring. Flooding is influenced by the rise and fall of the White River in most of the area.

The minor soils in this map unit are in the Bonn, Calhoun, Calloway, and Kobel series. The poorly drained Bonn and Calhoun soils and the somewhat poorly drained Calloway soils are on adjacent terraces. The poorly drained Kobel soils are on backswamps along the lower reaches of tributary streams to the White River.

Most of this unit is in woodland, but several tracts have been cleared and the drainage improved, and they are used for crop production. The trend in the use of these soils is toward cropland. None of the areas are in urban use.

The soils in this unit are poorly suited to cultivated crops, and only crops that have a short growing season can be safely grown. These soils are moderately suited to pasture. Flooding is the main limitation to crops and pasture. These soils are well suited to woodland, but wetness and flooding are severe limitations to the use of equipment. The soils in this unit are poorly suited to most urban uses because of flooding and wetness. These limitations are impractical to overcome without major flood control measures.

3. Rexor-Nugent

Well drained and excessively drained, level, loamy and sandy soils; on bottom lands of the Little Red River

This map unit is in a narrow area diagonally crossing the central part of the county. The soils in this unit are on natural levees and below breaks in natural levees. These soils formed in loamy and sandy alluvium.

This map unit covers about 2 percent of White County. About 45 percent of the unit is Rexor soils, 20 percent is Nugent soils, and the remaining 35 percent is soils of minor extent.

The well drained Rexor soils are on the higher parts of natural levees. They have a brown, silt loam surface layer, and a brown, mottled, silty clay loam and dark yellowish brown, mottled, silt loam subsoil. The excessively drained Nugent soils are on the lower natural levees closer to stream channels. They have a brown, loamy fine sand surface layer and brown, fine sandy loam; brown, loamy sand; and yellowish brown, loamy sand underlying material. Both soils are occasionally flooded during the winter and spring except for a small area between Judsonia and Pangburn.

The minor soils in this map unit are in the Spadra, Leadvale, Taft, and Guthrie series. The well drained Spadra soils are on a similar landscape position. The moderately well drained Leadvale soils, the somewhat poorly drained Taft soils, and the poorly drained Guthrie soils are on adjacent upland terraces.

Except for a few small inaccessible areas, the soils in this map unit are mostly cultivated. A few areas are used as pasture. Most of the woodland has been confined to river and creek banks. Urban use of this unit is for river front homes.

The soils in this unit are mostly moderately suited to cultivated crops. Flooding is the main limitation, but warm-season crops requiring the full growing season can be grown in most years. The Nugent soils are droughty, and wind erosion is a limitation for cultivated crops. These soils are well suited to pasture. They are well suited to woodland, but the Nugent part of the unit has moderate limitations to use of equipment. This unit is poorly suited to most urban uses because of flooding. This limitation is impractical to overcome without major flood-control measures.

Areas dominated by deep, level to gently sloping soils formed in alluvial and loessial material; on old terraces

The map units in this group make up about 23 percent of White County. This group borders the bottom lands in the eastern and southern parts of the county and extends northwest to the ridges and valleys which begin where U.S. Highway 67 crosses White County.

4. Jackport-Crowley-Gore

Poorly drained, somewhat poorly drained, and moderately well drained, level and nearly level, loamy soils with clayey subsoils; on terraces

These soils are in the eastern part of the county. They are in broad, flat areas and depressions and on escarpments and sides of shallow valleys. The dominantly level landscape is broken by streams. The soils between the broad, flat areas and streams are nearly level and somewhat ridged by shallow valleys leading off the flat areas. These shallow valleys and

improved drainage systems carry most of the surface water leaving the area.

This map unit covers about 7 percent of White County. About 45 percent of the unit is Jackport soils, 30 percent is Crowley soils, and 15 percent is Gore soils. The remaining 10 percent is minor soils and water areas.

The poorly drained, level and undulating Jackport soils are in flat or depressed areas at lower elevations. They have a dark grayish brown and light brownish gray, mottled, silty clay loam surface layer and subsurface layer. The subsoil is grayish brown, mottled clay and grayish brown silty clay. The somewhat poorly drained, level Crowley soils are in flat areas at higher elevations. They have a dark grayish brown and gray, mottled, silt loam surface layer and a gray, mottled, silt loam subsurface layer. The subsoil is gray, mottled silty clay. The moderately well drained, nearly level Gore soils are on intervening escarpments and sides of shallow valleys. They have a brown, silt loam surface layer and a pale brown, mottled, silt loam subsurface layer. The subsoil is reddish brown, mottled silt loam; red, mottled silty clay; and gray, mottled silty clay. The underlying materials are red, mottled clay. The clayey subsoil slows the movement of water through these soils. Jackport and Crowley soils have seasonal high water tables. The erosion hazard is severe on Gore soils.

The minor soils in this map unit are in the Kobel, Tichnor, Oaklimeter, Calloway, and Calhoun series. The poorly drained Kobel and Tichnor soils and the moderately well drained Oaklimeter soils are on bottom lands. Other minor soils on a landscape position similar to that of the major soils in this unit are the somewhat poorly drained Calloway soils and the poorly drained Calhoun soils.

The soils in this map unit are mostly used for cultivation. Many areas are double cropped sometime during the rotation. Very little woodland remains in this unit. A small area at Georgetown is in urban use.

The soils in this unit are mostly moderately suited to cultivated crops, but about 15 percent is poorly suited to this use. These soils are moderately suited to well suited to pasture. Wetness is the main limitation to crops and pasture throughout most of the area, but erosion is the main limitation in a few places. These soils are well suited to woodland. Limited use of equipment because of wetness is the main limitation. This unit is poorly suited to most urban uses. Slow to very slow permeability is a severe limitation for septic tank absorption fields. Shrinking and swelling are severe limitations for dwellings and small commercial buildings. Low strength and shrinking and swelling are severe limitations for local roads and streets. Wetness is also a severe limitation for urban use of the Crowley and Jackport soils. These limitations are difficult or impractical to overcome.

5. Calhoun-Calloway-Loring

Poorly drained, somewhat poorly drained, and moderately well drained, level to gently sloping, loamy soils; on loessial terraces

This map unit is in the eastern and southern parts of the county. These soils are in broad, flat areas and depressions and on low escarpments and some narrow drainage divides. The dominantly level landscape is broken by streams that flow southeasterly through this area from the valleys and ridges to the west. Joining these major streams are intermittent streams that lead across low escarpments to the broad, flat areas or into the higher land to the west. Most of the surface water leaving this unit is through these streams or improved drainage systems.

This map unit covers about 16 percent of White County. About 35 percent of the unit is Calhoun soils, 30 percent is Calloway soils, and 30 percent is Loring soils. The remaining 5 percent is minor soils and water areas.

The poorly drained, level Calhoun soils are in broad, flat areas and depressions. They have a grayish brown, silt loam surface layer and a gray, mottled, silt loam subsurface layer. They have a subsoil of gray and grayish brown, mottled silt loam and silty clay loam. The somewhat poorly drained, level Calloway soils in broad, flat areas have a brown, silt loam surface layer, and a pale brown, mottled, silt loam subsurface layer. The subsoil is yellowish brown, mottled silt loam. The moderately well drained, nearly level and gently sloping Loring soils are on low escarpments and narrow drainage divides. They have a brown, silt loam surface layer. The subsoil is strong brown silt loam, yellowish brown silty clay loam, and yellowish brown, mottled silt loam and silty clay loam. Calloway and Loring soils have a compact, brittle fragipan at a depth of about 2 feet. All soils in this unit have a seasonal high water table.

The minor soils in this unit are in the Oaklimeter, Tichnor, Crowley, and Gore series. The moderately well drained Oaklimeter soils and the poorly drained Tichnor soils are on flood plains of streams traversing the area. Other minor soils are the somewhat poorly drained Crowley soils and the moderately well drained Gore soils, which are on similar positions on the landscape.

Most of the soils in this map unit are used for cultivation. Many areas are double cropped sometime during the rotation. There are a few tracts of woodland remaining. Because major transportation facilities are located within this unit, it has extensive urban use.

About half of the soil areas in this map unit are well suited to cultivated crops; the rest are moderately suited. Wetness and erosion are the main limitations to use for crops. About one-third of these areas are well suited to pasture and two-thirds are moderately suited. Wetness is the main limitation to this use. These soils are well suited to woodland, but wetness is a limitation to the use of equipment on the level Calhoun and Calloway soils. This unit is poorly suited to most urban uses. Wetness and

slow permeability are severe limitations for septic tank absorption fields. Wetness is a moderate or severe limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. In addition, wetness is a severe limitation for this use of the Calhoun soils and slope is a moderate limitation for the gently sloping Loring soils. These limitations are difficult or impractical to overcome.

Areas dominated by deep and moderately deep, level to steep soils formed in material weathered from acid sandstone, siltstone, and shale; in valleys and on ridges

The map units in this group make up about 62 percent of White County. This group is in the northern and western part of the county, lying generally west of U.S. Highway 67.

6. Leadvale-Barling-Taft

Deep, moderately well drained and somewhat poorly drained, level to gently sloping, loamy soils formed in alluvial and colluvial material

This map unit is in upland valleys in the north-central and southwest part of the county. These soils are on bottom lands and terraces of bayous and creeks and along toe slopes of ridges. This unit is bounded by high, steep ridges throughout most of the area. Generally the bottom lands are level, and the adjacent terraces are level or nearly level. The terraces are crossed frequently by intermittent streams and draws leading through the gently sloping toe slopes from the sides of the ridges. Most of the surface water leaves this unit through these streams, which generally flow in a southeastern direction.

This map unit covers about 16 percent of White County. About 55 percent is Leadvale soils, 15 percent is Barling soils, and 10 percent is Taft soils. The remaining 20 percent is minor soils.

The moderately well drained, nearly level and gently sloping Leadvale soils are on the higher parts of terraces and along toe slopes of ridges. They have a brown, silt loam surface layer. The subsoil is strong brown silt loam, yellowish brown silty clay loam, and yellowish brown, mottled silty clay loam. These soils have a fragipan at a depth of about 2 feet. The moderately well drained, level Barling soils are on bottom lands of creeks and bayous. They have a dark yellowish brown silt loam surface layer that is mottled in the lower part. They have a subsoil of brown, pale brown, and gray, mottled silt loam. The somewhat poorly drained, level and nearly level Taft soils are on the lower parts of terraces. They have a brown silt loam surface layer. The subsoil is yellowish brown, pale brown, and light brownish gray, mottled silt loam and yellowish brown, mottled silty clay loam. These soils have a fragipan about 2 feet beneath the surface.

The minor soils in this unit are in the Guthrie, Spadra, Enders, and Linker series. The poorly drained Guthrie soils are in depressed areas of terraces at the base of ridges, the well drained Spadra soils are on similar positions on the landscape; and the well drained Enders and Linker soils are on adjacent ridges.

The soils in this map unit are mostly used for crops and pasture. Woodland is in small wetter tracts scattered throughout the area. A few small urban and built-up areas are in this unit.

About half of the soil areas in this map unit are well suited to cultivated crops, and the rest are moderately suited to this purpose because of flooding, wetness, or erosion. Most of this unit is well suited to pasture, but wetness is a limitation in about 20 percent of the area. This unit is well suited to woodland. Because of wetness, the main limitation is to the use of equipment in about 20 percent of the area. Rural residences and small built-up areas are the main urban uses. This unit is moderately suited to poorly suited to most urban uses. Leadvale soils are moderately suited and are mainly limited by wetness and slow permeability, which can generally be overcome. Barling and Taft soils are poorly suited, and limitations are difficult or impractical to overcome. The main limitations are flooding and wetness on the Barling soils and wetness and slow permeability on the Taft soils.

7. Steprock-Enders

Moderately deep and deep, well drained, moderately sloping to steep, flaggy and stony, loamy soils formed in residual and colluvial material

This map unit is in the northern and western parts of the county. These soils are intermingled on sides of ridges which face the terraces and bottom lands to the east and border the narrow, winding stream valleys that dissect the ridges. The terrain is rugged and has frequent rock outcrops and some nearly vertical bluffs. Drainage of this unit is through intermittent streams.

This map unit covers about 19 percent of White County. About 35 percent of this unit is Steprock soils, 20 percent is Enders soils, and the remaining 45 percent is minor soils.

The flaggy Steprock soils are in the more sloping areas generally upslope from the Enders soils, but they are somewhat intermingled with Enders soils in some areas. They have a dark grayish brown, very flaggy loam surface layer and a brown and yellowish brown very flaggy loam and very flaggy fine sandy loam subsurface layer. The subsoil is strong brown and yellowish red very gravelly loam. The underlying material is yellowish red sand and partly weathered bedrock. The stony Enders soils, which are somewhat intermingled with Steprock soils in some areas, are generally downslope from the Steprock soils. They have a dark grayish brown and strong brown, stony fine sandy loam surface layer. The subsoil is strong brown loam; yellowish red, and

yellowish red, mottled silty clay; and variegated red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

The minor soils are in the Barling, Mountainburg, Leadvale, Spadra, Linker, and Sidon series. The moderately well drained Barling soils are on flood plains, and the moderately well drained Leadvale soils and the well drained Spadra soils are on terraces. The well drained Linker and the moderately well drained Sidon soils are on ridgetops and benches, and the well drained, shallow Mountainburg soils are on the rims of ridgetops and benches.

Most of this map unit is used for woodland. Some of the less sloping areas are used as pasture or range. Urban use is uncommon.

The soils in this unit are generally unsuitable for cultivated crops. The slopes and stones on the surface interfere with the use of equipment. Erosion is also a severe to very severe hazard. These soils are poorly suited to pasture. These soils are moderately suited to woodland, but slopes and stones are moderate limitations to the use of equipment. These soils are poorly suited to most urban uses. High shrink-swell potential, slope, and very slow permeability are the main limitations on the Enders soils. Depth to rock and slope are the main limitations on the Steprock soils. These limitations are difficult or impractical to overcome.

8. Linker-Steprock

Moderately deep, well drained, dominantly gently sloping to moderately sloping, loamy and gravelly soils formed in residual and colluvial material

This unit is in the western part of the county. These soils are on tops and sides of hills and low ridges which are commonly along the divides of the major drainage areas. Drainage of this area is through intermittent streams, many of which originate within the area.

This map unit covers about 14 percent of White County. About 55 percent is Linker soils, 20 percent is Steprock soils, and the remaining 25 percent is minor soils.

The gently sloping Linker soils are on hill tops, ridgetops, and benches or are intermingled with Steprock soils on the sides and foot slopes of hills and ridges. They have a brown, fine sandy loam surface layer. The subsoil is yellowish red sandy clay loam and yellowish red, mottled gravelly fine sandy loam. The underlying material is weathered bedrock over hard sandstone. The gently sloping and moderately sloping gravelly Steprock soils are intermingled on sides and toe slopes of hills and ridges with the Linker soils. They have a brown, gravelly fine sandy loam surface layer and a yellowish red, mottled, very gravelly loam subsoil. The underlying material is partly weathered siltstone, shale, and sandstone. The minor soils in this map unit are in the Enders, Mountainburg, Nauvoo, Barling, Guthrie, Leadvale, Spadra, and Taft series. The well drained Enders, Mountainburg, and Nauvoo soils are on a similar landscape, the moderately well drained Barling soils are on flood plains, and the poorly drained Guthrie soils are in depressions. The moderately well drained Leadvale soils, the well drained Spadra soils, and the somewhat poorly drained Taft soils are on terraces and toe slopes.

The soils in this map unit are mostly used as pasture. A few, less sloping areas are used for crops, and the steeper areas are used mainly for woodland. A few small urban and built-up areas are in this unit.

The soils in this unit are mostly moderately suited to cultivated crops, but in some areas they are poorly suited because of slope. Erosion is a severe hazard where cultivated crops are grown. These soils are well suited to pasture and moderately suited to woodland. There are no significant limitations to woodland use. The soils in this unit are moderately suited to most urban uses. Depth to rock is a severe limitation for septic tank filter fields, and a moderate limitation for dwellings, small commerical buildings, and local roads and streets in part of the area. This limitation is difficult or impractical to overcome. Slope is a moderate to severe limitation for small commercial buildings.

9. Linker-Sidon

Moderately deep and deep, well drained and moderately well drained, nearly level to gently sloping, loamy soils formed in residual material

This map unit is in the north-central part of the county. These soils are on undulating ridgetops and broad benches, generally bounded by steep ridge sides. A few smaller ridges rise above the general landscape. These soils are underlain by hard sandstone. Drainage of the area is through intermittent streams which cease to flow shortly after rainfall.

This map unit covers about 12 percent of White County. About 50 percent is Linker soils, 25 percent is Sidon soils, and the remaining 25 percent is minor soils.

The well drained, gently sloping Linker soils are on the higher parts of the landscape. They have a brown, fine sandy loam surface layer. The subsoil is yellowish red sandy clay loam and yellowish red gravelly fine sandy loam. The underlying material is weathered bedrock over hard sandstone. The moderately well drained, nearly level to gently sloping Sidon soils are on the lower parts of the landscape. They have a brown, loam surface layer. The subsoil is strong brown, yellowish brown, and strong brown, mottled clay loam. It is underlain by hard sandstone.

The minor soils in this unit are in the Allen, Mountainburg, Enders, Steprock, Barling, Leadvale, Spadra, and Taft series. The well drained Allen soils are on hillsides and foot slopes of ridges, the well drained, shallow Mountainburg soils are on rims of ridgetops and benches, and the well drained Enders and Steprock soils are on sides of ridges. The moderately well drained Barling soils are on flood plains, and the moderately well

drained Leadvale soils, the well drained Spadra soils, and the somewhat poorly drained Taft soils are on terraces or on toe slopes.

The soils of this map unit are used for crops and pasture. Woodland is in small tracts mostly along drainageways. Areas along the highways leaving Searcy, Judsonia, and Bald Knob are used extensively for rural residences.

In about one-third of this unit, the erosion hazard is moderate but the soils are well suited to cultivated crops. In the remaining area, the soils are moderately suited and the erosion hazard is severe. These soils are well suited to pasture and moderately suited to woodland. They have no significant limitations for these uses. This unit is moderately suited to most urban uses. Depth to bedrock on Linker soils and wetness and slow permeability on Sidon soils are severe limitations for septic tank filter fields. These limitations are difficult or impractical to overcome. Depth to bedrock and wetness are also moderate limitations for dwellings, small commerical buildings, and local roads and streets. The low strength of the Sidon soils is also a moderate limitation for local roads and streets.

10. Linker-Enders

Moderately deep and deep, well drained, gently sloping to steep, loamy and stony soils formed in residual material

This map unit is in the north-central and southwest parts of the county. These soils are on tops and sides of ridges. Over most of the area the ridgetops are narrow and benches are common along the sides of ridges, but in the southwest part of the county, on Nipper Mountain, there is a broad, undulating, hilly area encircled by a ridge. Surface water leaves these areas through intermittent streams.

This map unit covers about 1 percent of White County. About 50 percent is Linker soils, 20 percent is Enders soils, and the remaining 30 percent is minor soils.

The gently sloping, moderately deep Linker soils are on ridgetops, hilltops, and benches. They have a surface layer of brown fine sandy loam. They have a subsoil of yellowish red sandy clay loam and yellowish red, mottled gravelly fine sandy loam. The underlying material is weathered bedrock over hard sandstone. The gently sloping to steep, deep Enders soils are on sides of ridges. They have a surface layer of dark grayish brown and strong brown stony fine sandy loam. The subsoil is strong brown loam; yellowish red and yellowish red, mottled silty clay; and variegated red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

The minor soils in this unit are in the Barling, Leadvale, Spadra, Taft, Mountainburg, and Steprock series. The moderately well drained Barling soils are on flood plains; and the moderately well drained Leadvale soils, the well drained Spadra soils, and the somewhat poorly drained Taft soils are on terraces or on toe slopes. The well drained Mountainburg soils are on rims of ridgetops and benches, and the well drained Steprock soils are on similar positions on the landscape to those of the Linker and Enders soils.

The soils in this map unit are mostly used as pasture. A few less sloping areas are used for crops. The steeper ridges are used for woodland. Urban use is uncommon in this unit.

About half of the acreage is moderately suited to cultivated crops. Erosion is the main limitation. About three-fourths of the unit is well suited to pasture. These soils are moderately suited to woodland, but in some areas slope and stones are moderate limitations to the use of equipment. Most of this unit is moderately suited to urban use. Depth to bedrock on the Linker soils and slope and very slow permeability on the Enders soils are severe limitations for septic tank filter fields. These limitations are difficult or impractical to overcome. On the Linker soils, depth to bedrock is a moderate limitation for dwellings, small commercial buildings, and local roads and streets. On the Enders soils, shrinking and swelling and slope are severe limitations for dwellings and small commercial buildings and low strength, shrinking and swelling, and slope are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

broad land use considerations

The soils in White County vary widely in their potential for major land uses. Approximately 40 percent of the county is cropland, and an estimated 200,000 acres is harvested annually. The main crops are soybeans, rice, grain sorghum, wheat, and forage crops. This cropland is scattered throughout the county, but most is in units 1, 2, 3, 4, 5, and 6 of the general soil map, which have a high percentage of level or nearly level, loamy soils. Soils in units 1 and 2 are subject to frequent flooding during the winter and spring. Wetness and flooding are the major limitations for crops. The major soils in these units are Commerce, Kobel, Oaklimeter, and Tichnor soils. Units 3, 4, 5, and 6 have a high percentage of prime farmland. Wetness, occasional flooding, and a moderate erosion hazard are the main limitations for crops in these units. The major soils in these units are Calhoun, Calloway, Leadvale, and Loring soils, which are often double cropped during the rotation. Units 7, 8, 9, and 10 are on sides and tops of ridges and hills. These units are not used extensively for crops. The hazard of erosion is the main limitation for crops. Sidon and Linker soils in unit 9 are the main soils used for cultivated crops.

About 25 percent of the land in the county is used for pasture and hay. This is mostly in units 6, 7, 8, 9, and 10, which are dominantly in valleys and on ridges. Except for unit 7, which is generally rolling or steep and flaggy or stony, these units are well suited to pasture. The major soils in these units are Enders, Leadvale,

Linker, Sidon, and Steprock soils. Wetness or flooding is the main limitation to pasture in units 1, 2, 4, and 5. Unit 3, on the bottom lands of the Little Red River, is well suited to pasture.

An estimated 30 percent of the county is woodland, and several small tracts have been cleared recently. Generally, the soils in units 1 and 2 are best suited to hardwoods; units 3, 4, 5, and 6 are suitable for both hardwood and pine; and units 7, 8, 9, and 10 are most suitable for pine. The use of equipment is restricted on some soils except during the drier seasons. In most of unit 7, slopes and stones are limitations to the use of equipment.

About 21,358 acres of the county is classified as urban or built-up land. None of the units are without severe limitations for urban use. Flooding is a severe limitation in units 1, 2, and 3. In unit 4 limitations are mainly wetness, slow percolation, and shrinking and swelling. In units 5 and 6 they are wetness, slow percolation, and low strength; and in units 7, 8, 9, and 10 they are mainly depth to rock, slope, slow percolation, and shrinking and swelling. Sites that are suitable for houses or small commerical buildings are located in all units except units 1 and 2, which are frequently flooded. Most areas will need some corrective measures before or during construction of urban facilities.

White County soils are ample for recreational use if managed properly. Units 1, 2, and 3 have severe limitations for most recreational uses, but about 16,000 acres is a wildlife management area used for public fishing and hunting. In units 4, 5, and 6, wetness is a moderate or severe limitation for intensive recreational development, but there are reservoirs for fishing, and the soils are suitable for this use as well as for hunting. The soils in unit 7 are poorly suited to intensive recreational development because of slope and stones, but they are used for their scenic values. Units 8, 9, and 10 are most suitable for intensive recreational development. The soils in these units have only slight or moderate limitations for this use.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Leadvale silt loam, 1 to 3 percent slopes, is one of several phases in the Leadvale series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Enders-Steprock complex, 12 to 30 percent slopes is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

1—Allen fine sandy loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on hillsides and foot slopes of ridges. Individual areas range from 10 to 40 acres.

Typically, the surface layer is brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of 72 inches or more. The upper 5 inches is strong brown fine sandy loam; the middle part to a depth of about 25 inches, is yellowish red loam with a few mottles in the lower part; and the lower part is red, mottled clay loam.

This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout, except where limed. Permeability is moderate, and the available water capacity is high. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are areas where slope is as much as 12 percent; some soils with similar textures that have strong brown colors in the middle part of the subsoil; and other soils similar to the Allen soil that have a loamy sand texture in the lower part of the subsoil. Also included are a few intermingled areas of Linker and Sidon soils.

This Allen soil is moderately suited to cultivated crops. The main crops are soybeans, grain sorghum, and winter small grain. Strawberries and truck crops are also grown on this soil. Erosion is a severe hazard where cultivated crops are grown. Minimum tillage, the use of cover crops, and including grasses and legumes in the cropping system reduce runoff, control erosion, and maintain good tilth. This soil is well suited to pasture, which is the main use. Adapted pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, and annual and sericea lespedeza.

This soil is well suited to woodland. Loblolly pine and shortleaf pine are adapted species. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Moderate permeability is a moderate limitation for septic tank filter fields. Limitations are slight for dwellings, but slope is a moderate limitation for small commercial buildings. Low strength is a moderate limitation for local roads and streets. These limitations can generally be overcome by proper engineering design.

This soil is in capability unit IIIe-1 and woodland suitability group 3o7.

2—Barling silt loam, occasionally flooded. This deep, moderately well drained, level soil is on flood plains along small streams. Individual areas range from 10 to 150 acres.

Typically the surface layer, about 8 inches thick, is dark yellowish brown silt loam that is mottled in the lower half. The subsoil extends to a depth of about 72 inches. To a depth of 34 inches, it is brown, mottled silt loam; to a depth of 46 inches, it is pale brown, mottled silt loam; and below that it is silt loam mottled in shades of gray and brown.

Permeability is moderate, and the available water capacity is high. Flooding occurs mainly during the winter and early spring. The perched water table is 1 foot to 4 feet below the surface from December to April. This soil is moderate in natural fertility and organic matter content. The surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are areas of a soil that has a fine sandy loam surface layer and more than 15 percent sand in the control section. Also included are small areas of a soil without gray mottles in the upper 24 inches of the subsoil. These included areas are in long, very narrow bands adjacent to the stream. Also included are a few areas of Guthrie, Spadra, Oaklimeter, and Taft soils.

This Barling soil is moderately suited to cultivated crops. Because of brief flooding during the winter and early spring, only warm-season row crops can be safely grown. The principal crop is soybeans. Corn and grain

Figure 1.—Grain sorghum grows and produces well on Barling silt loam, occasionally flooded.

sorghum (fig. 1) are other suitable crops. This soil is well suited to pasture or hay, and it is mainly used for this. Adapted pasture plants include bermudagrass, tall fescue, and white clover.

This soil is well suited to woodland. Eastern cottonwood, American sycamore, shortleaf pine, and loblolly pine are adapted species. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Flooding and wetness are severe limitations for septic tank filter fields. Flooding is a severe limitation for dwellings, small commercial buildings, and local roads and streets. These limitations are impractical to overcome without major flood-control measures.

This soil is in capability unit IIw-1 and woodland suitability group 2o7.

3—Bonn silt loam, 0 to 1 percent slopes. This deep, poorly drained, level soil is on flats and in depressions on the lower parts of terraces. Individual areas range from 20 to 40 acres.

Typically, the surface layer is grayish brown silt loam about 5 inches thick. The subsurface layer, to a depth of 14 inches, is light gray, mottled silt loam. The subsoil extends to a depth of about 72 inches. To a depth of 24 inches, it is light brownish gray silt loam with tongues of light gray; to a depth of 55 inches, it is light brownish gray, mottled silty clay loam; and below that it is silt loam.

Permeability is very slow. The available water capacity is low. The water table is perched within 2 feet of the surface from December through April. A few areas are ponded for short periods. This soil is low in natural fertility and low in organic matter content. The surface layer ranges from medium acid to neutral, and the subsoil is neutral to moderately alkaline throughout. This soil has a high concentration of sodium and magnesium within 16 inches of the surface. This limits further penetration of plant roots. The response to fertilizer is poor.

Included with this soil in mapping are some soils that are similar in profile characteristics to the Bonn soil but are very strongly acid in the subsoil. Also included are a few small areas of Calhoun and Tichnor soils.

This Bonn soil is poorly suited to cultivated crops because it is droughty and has a high concentration of sodium and magnesium in the subsoil (fig. 2). Plants grown in most areas of this soil are stunted, and in some spots they die before maturity. Grading and smoothing are generally not feasible, because bringing the shallow layers affected by sodium and magnesium too near the surface further restricts productivity. Excess surface water is also a severe hazard. This soil is cultivated mainly as part of fields of other soils. The main crop is soybeans, but yields are low. Where surface drainage is adequate, shallow-rooted cool-season plants thrive better than warm-season crops. Of the warm-season crops, rice produces the most favorable yields. This soil is poorly suited to pasture and hay. Pasture plants most likely to survive are common bermudagrass, annual lespedeza, and bahiagrass.

This soil is poorly suited to woodland. Because of the high concentration of sodium and magnesium in the upper part of the subsoil, this soil is generally not suitable for production of commercial trees.

This soil is poorly suited to most urban uses. Wetness and very slow permeability are severe limitations for septic tank filter fields. Wetness is a severe limitation for dwellings and small commercial buildings. Low strength and wetness are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVs-1 and is not assigned to a woodland suitability group.

4—Calhoun silt loam, 0 to 1 percent slopes. This deep, poorly drained, level soil is on broad flats and shallow depressions of terraces. Individual areas are 20 to 200 acres or more.

Typically, the surface layer is grayish brown silt loam about 6 inches thick. The subsurface layer, to a depth of 14 inches, is gray, mottled silt loam. The subsoil extends to a depth of about 72 inches. To a depth of 29 inches, it is gray, mottled silt loam; to a depth of 40 inches, it is grayish brown, mottled silty clay loam; and below that it is gray, mottled silt loam and gray, mottled silty clay loam.

Permeability is slow and the available water capacity is high. The water table is perched within 2 feet of the surface from December through April. This soil is moderate in natural fertility and organic matter content. It is strongly acid or very strongy acid throughout except where the surface layer has been limed or similarly affected by irrigation water.

Included with this soil in mapping are a few circular mounds, small areas of Calloway soils, and small areas of Loring soils. Also included are soils similar to the Calhoun soil that have red mottles in the upper part of the subsoil.

This Calhoun soil is moderately suited to cultivated crops. Most of the acreage is cultivated. The principal crops are soybeans, grain sorghum, and rice. Winter small grain can be grown where surface drainage is adequate. Excess surface water is a severe hazard, and farming operations may be delayed several days after a rain. Adequate drainage helps make timely farming operations possible and lessens restrictions on the choice of crops. Minimum tillage and proper management of crop residue reduce erosion and help maintain good tilth. This soil is moderately suited to pasture and hay. Adapted pasture plants include bermudagrass, bahiagrass, tall fesuce, white clover, and annual and sericea lespedeza. Seasonal wetness is the main limitation for pasture use.

Figure 2.—Typical area of Bonn silt loam, 0 to 1 percent slopes. Where areas are bare, plants have been adversely affected by droughtiness and the high concentration of sodium and magnesium in the subsoil.

This soil is well suited to woodland. Loblolly pine, cherrybark oak, water oak, and sweetgum are adapted species. Wetness is a severe limitation to the use of equipment, but this can be easily overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a severe limitation for dwellings and small commerical buildings. Low strength and wetness are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-1 and woodland suitability group 3w9.

5—Calloway silt loam, 0 to 1 percent slopes. This deep, somewhat poorly drained, level soil is in broad, flat areas of terraces. Individual areas range from 10 to 200 acres or more.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsurface layer, to a depth of 8 inches, is pale brown, mottled silt loam. The subsoil extends to a depth of about 72 inches. To a depth of 24 inches, it is yellowish brown, mottled silt loam; to a depth of 29 inches, it is light gray, mottled silt loam; and below that it is a firm, brittle fragipan of yellowish brown, mottled silt loam.

Permeability is slow, and the available water capacity is high. The water table is perched within 1 foot to 2 feet of the surface from January through April. This soil is moderate in natural fertility and low in organic matter content. It is medium acid to very strongly acid in the surface layer and upper part of the subsoil except where the surface layer has been limed or similarly affected by irrigation water. The lower part of the subsoil is medium

acid or strongly acid. This soil has a compact, brittle fragipan at about 24 to 38 inches which restricts penetration of roots and water movement through the soil.

Included with this soil in mapping are a few small areas of Calhoun and Loring soils and a few areas of a soil similar to the Calloway soil that has a thin clayey layer above the fragipan.

This Calloway soil is well suited to cultivated crops. The principal crops are soybeans and grain sorghum. Rice is another suitable crop. Winter small grain can be grown if surface drainage is adequate. Wetness is a moderate hazard, and farming operations may be delayed a few days after a rain. Installing surface drains helps make timely farming operations possible and lessens restrictions on the choice of crops. Minimum tillage and proper management of crop residue reduce erosion and help maintain good tilth. This soil is moderately suited to pasture and hay. In some years it may become too wet for grazing during the winter and early spring. Adapted pasture plants include bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedeza.

This soil is well suited to woodland. Loblolly pine, cherrybark oak, water oak, and sweetgum are adapted species. Wetness is a moderate limitation to the use of equipment, but this can be easily overcome by deferring the harvest or management of the tree crop to the drier season.

This soil is poorly suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a severe limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIw-2 and woodland suitability group 2w8.

6—Commerce silty clay loam, frequently flooded. This somewhat poorly drained, level soil is on alluvial plains and natural levees. Individual areas range from about 30 to 2,000 acres.

Typically, the surface layer is brown silty clay loam about 4 inches thick. The subsoil extends to a depth of about 32 inches. To a depth of 15 inches, it is grayish brown, mottled silty clay loam, and below that it is dark grayish brown, mottled silty clay loam. The underlying material to a depth of 72 inches or more is dark gray, mottled silty clay.

Permeability is moderately slow, and the available water capacity is very high. The seasonally high water table is within 1.5 to 4 feet of the surface from December through April. Flooding occurs annually, but the duration of flooding is regulated by upstream impoundments, which allow floodwaters to recede by normal planting dates in most years. The soil is high in natural fertility and moderate in organic matter content. It is medium acid to neutral in the surface layer and slightly acid to neutral in the subsoil. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Kobel and Robinsonville soils. Also included in mapping are a few areas where slope is 1 to 3 percent, or the surface layer is fine sandy loam or silt loam, and areas of soils similar to the Commerce soil that have a thicker and darker colored A horizon.

This Commerce soil is poorly suited to cultivated crops because of frequent flooding. Crops that require a short growing season can be grown in most years. The principal crop is soybeans. Grain sorghum is grown in some of the highest areas. Flooding often delays planting in some low areas, but most of the area can be planted by June 15. In some years crops are harvested prematurely to avoid more extensive flood damage. Occasionally crops growing in a few of the lowest places are destroyed by fall flooding. Field drains may be needed in some areas to prevent ponding of water during the growing season. The surface forms clods if plowed when wet, and seedbed preparation is difficult. This soil is moderately suited to pasture and hay. Adapted pasture plants include bermudagrass and tall fescue. Seasonal wetness and flooding are the main limitations for pasture.

This soil is well suited to woodland. Green ash, American sycamore, eastern cottonwood, pecan, and water oak are adapted species. Wetness and flooding are moderate limitations to the use of equipment, but this can be overcome by deferring the harvest or management of the tree crop to the drier season.

This soil is poorly suited to most urban uses. Flooding, wetness, and moderately slow permeability are severe limitations for septic tank filter fields. Flooding is a severe limitation for dwellings and small commercial buildings. Low strength and flooding are severe limitations for local roads and streets. These limitations are impractical to overcome without major flood control measures.

This soil is in capability unit IVw-1 and woodland suitability group 1w5.

7—Crowley silt loam, 0 to 1 percent slopes. This deep, somewhat poorly drained, level soil is in broad, flat areas at the higher elevations of old terraces. Individual areas range from about 40 to 300 acres or more.

Typically, the surface layer is dark grayish brown and gray, mottled silt loam about 8 inches thick. The subsurface layer is gray, mottled silt loam that extends to a depth of about 21 inches. The subsoil extends to a depth of about 72 inches. To a depth of 38 inches it is gray, red, mottled silty clay, and below that it is gray, yellowish brown, mottled silty clay.

Permeability is very slow. The available water capacity is high. The water table is perched and is within 0.5 foot to 1.5 feet of the surface from December through April. This soil is moderate in natural fertility and organic matter content. Except where limed or similarly affected

by irrigation water, the surface layer is medium acid to very strongly acid. The upper part of the subsoil is very strongly acid to slightly acid and the lower part is medium acid to moderately alkaline. The rooting zone is deep but is somewhat restricted by the clayey subsoil.

Included with this soil in mapping are a few small areas of Jackport and Gore soils. Also included are areas of a similar soil that does not have red mottles in the subsoil and other similar soils in which the red mottled layer is slightly thinner than that of Crowley soils. In some areas, small circular mounds are intermingled with the Crowley soil.

This Crowley soil is moderately suited to cultivated crops. Most of the acreage is cultivated. The principal crops are rice, (fig. 3) soybeans, and grain sorghum. Winter small grain can be grown if surface drainage is adequate. Excess surface water is a severe hazard, and farming operations may be delayed several days after a rain. Adequate surface drainage helps make timely farming operations possible and lessens restrictions on the choices of crops. Minimum tillage and proper management of crop residue reduce erosion and help maintain good tilth. This soil is moderately suited to pasture. Adapted pasture plants include bermudagrass, tall fescue, and white clover. Seasonal wetness is the main limitation for pasture.

This soil is well suited to woodland. Loblolly pine, southern red oak, water oak, and sweetgum are adapted species. Wetness is a severe limitation to the use of equipment, but this can be overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

Figure 3.—Rice on Crowley silt loam, 0 to 1 percent slopes. Rice grows well on this soil.

This soil is poorly suited to most urban uses. Very slow permeability and wetness are severe limitations for septic tank absorption fields. Wetness and high shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-2 and woodland suitability group 3w9.

8—Enders fine sandy loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on sides of low ridges and on foot slopes of high ridges. Individual areas range from 10 to 80 acres.

Typically, the surface layer, about 9 inches thick, is fine sandy loam that contains about 10 percent gravel. It is dark grayish brown in the upper 4 inches and strong brown in the lower part. The subsoil extends to a depth of about 41 inches. To a depth of 13 inches it is strong brown loam; to a depth of 35 inches, it is yellowish red silty clay that is mottled with shades of yellowish brown and red in the lower part; and below that it is variegated in shades of red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

Permeability is very slow, and the available water capacity is medium. Runoff is rapid. This soil is low in natural fertility and moderate in organic matter content. It is strongly acid to extremely acid throughout.

Included with this soil in mapping are areas where the surface layer is silt loam, gravelly loam, or gravelly silt loam and a few small areas where the soil has been eroded. Also included are small areas of Leadvale, Steprock, Linker, and Mountainburg soils.

This Enders soil is poorly suited to cultivated crops. A small acreage is used for cultivated forage crops, soybeans, and grain sorghum. In places the surface layer is thin and the soil is somewhat droughty. The erosion hazard is very severe. Under a management system that includes erosion control, clean tilled crops and sown crops can be grown in rotation with grasses and legumes. Terraces and contour cultivation, minimum tillage, the use of cover crops, and including grasses and legumes in the cropping system reduce runoff, help control erosion, and help maintain good tilth. This soil is moderately suited to pasture and hay. Most of the cleared areas are used for this purpose. Adapted pasture plants include bahiagrass, bermudagrass, and annual and sericea lespedeza.

This soil is moderately suited to woodland, and this is the main use. Southern red oak, white oak, shortleaf pine, and eastern redcedar are adapted species. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Very slow permeability is a severe limitation for septic tank filter fields. High shrink-swell potential is a severe limitation for dwellings and small commercial buildings. Low strength and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVe-1 and woodland suitability group 4o1.

9—Enders gravelly fine sandy loam, 8 to 12 percent slopes. This deep, well drained, moderately sloping soil is on sides of low ridges and foot slopes of high ridges. Individual areas range from 20 to 200 acres.

Typically, the surface layer is gravelly fine sandy loam about 8 inches thick. It is dark grayish brown in the upper 3 inches and strong brown in the lower part. The subsoil extends to a depth of about 41 inches. To a depth of 12 inches, it is strong brown loam; to a depth of 34 inches, it is red silty clay that is mottled with shades of yellowish brown in the lower part; and below that it is variegated red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

Permeability is very slow, and the available water capacity is medium. Runoff is rapid. This soil is low in natural fertility and moderate in organic matter content. It is strongly acid to extremely acid throughout. The rooting zone is deep, but roots penetrate the clayey subsoil slowly.

Included with this soil in mapping are areas of a soil without a gravelly surface layer, other areas where the surface layer is gravelly loam or gravelly silt loam, and small areas where flat fragments are on the surface. Also included are small areas of Leadvale, Linker, Mountainburg, and Steprock soils.

This Enders soil is generally unsuitable for cultivated crops. Runoff is rapid, and the erosion hazard is very severe. In places the surface layer is thin and the soil is somewhat droughty. The slope and gravelly surface restrict the use of some farm equipment. This soil is moderately suited to pasture and hay. Most of the cleared areas are used for this purpose. Adapted pasture plants include bahiagrass, bermudagrass, and annual and sericea lespedeza.

This soil is moderately suited to woodland, and this is the main use. Southern red oak, white oak, shortleaf pine, and eastern redcedar are adapted species. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Very slow permeability is a severe limitation for septic tank filter fields. High shrink-swell potential is a severe limitation for dwellings and small commercial buildings. Slope is also a severe limitation for small commercial buildings. Low strength and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIe-1 and woodland suitability group 4o1.

10—Enders stony fine sandy loam, 3 to 12 percent slopes. This deep, well drained, gently sloping to

moderately sloping soil is on foot slopes of high ridges and sides of low ridges. Individual areas range from 10 to 100 acres.

Typically, the surface layer is stony fine sandy loam about 9 inches thick. It is dark grayish brown in the upper 3 inches and strong brown in the lower part. The subsoil extends to a depth of about 41 inches. To a depth of 13 inches, it is strong brown loam. To a depth of 35 inches, it is yellowish red silty clay that is mottled with shades of yellowish brown and red in the lower half. The lower part is variegated red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

Permeability of this Enders soil is very slow, and the available water capacity is medium. Runoff is rapid. This soil is low in natural fertility and moderate in organic matter content. It is strongly acid to extremely acid throughout. The rooting zone is deep, but roots penetrate the clayey subsoil slowly.

Included with this soil in mapping are areas of a soil that has a surface layer of silt loam or loam, areas that are up to 10 acres with few or no stones on the surface, and a few small areas of Leadvale, Linker, Mountainburg, and Steprock soils. Also included are a few areas of a soil that is similar to the Enders soil but is less than 40 inches deep to bedrock.

This Enders soil is generally unsuitable for cultivated crops because stones interfere with the use of farm equipment. Runoff is rapid, and the hazard of erosion is very severe. This soil is somewhat droughty, and the surface layer is thin in many places. This soil is poorly suited to pasture and hay. Where surface stones are removed to facilitate the use of farm equipment, moderate amounts of forage are produced from native grasses and improved pasture. Adapted pasture plants include bahiagrass, bermudagrass, and annual and sericea lespedeza.

This soil is moderately suited to woodland, and most of it is used for this purpose. Southern red oak, white oak, shortleaf pine, and eastern redcedar are adapted species. Stones on the surface are moderate limitations to the use of equipment.

This soil is poorly suited to most urban uses. Very slow permeability is a severe limitation for septic tank filter fields. High shrink-swell potential is a severe limitation for dwellings. High shrink-swell potential and slope are severe limitations for small commercial buildings. Low strength and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIs-1 and woodland suitability group 4x2.

11—Enders-Steprock complex, 12 to 30 percent slopes. This complex consists of soils on moderately steep and steep sides of ridges. About 70 percent of this complex is deep, well drained Enders soils, and 20 percent is moderately deep, well drained Steprock soils. Generally the Enders soils are in the less sloping areas near the base of the ridges and on the lower part of draws within the ridges. The Steprock soils are generally in the more sloping areas toward the top of the ridges and draws within the ridges. Each soil is in long, narrow bands that follow the contour of the landscape. Mapped areas range from 20 to 400 acres or more. These soils are so intermingled that they could not be shown separately at the scale selected for mapping.

Typically, the surface layer of the Enders soil is stony fine sandy loam about 9 inches thick that has flat fragments and flagstones embedded in or lying on it. It is dark grayish brown in the upper 3 inches and strong brown in the lower part. The subsoil extends to a depth of about 41 inches. To a depth of 13 inches, it is strong brown loam; to a depth of 35 inches, it is yellowish red silty clay that is mottled with shades of brown and red in the lower part; and below that it is variegated red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

Typically, the surface layer of the Steprock soil is stony fine sandy loam about 8 inches thick that has flat fragments and flagstones embedded in and lying on the surface. The upper 4 inches is very dark grayish brown, and the lower 4 inches is yellowish brown. The subsoil is strong brown very gravelly loam to a depth of 12 inches and is yellowish red very gravelly clay loam to a depth of 29 inches. The underlying material is partly weathered sandstone, shale, and siltstone.

Permeability is very slow in the Enders soil and moderate in the Steprock soil. Runoff is rapid from both soils. The available water capacity is medium in the Enders soil and low in the Steprock soil. The Enders and Steprock soils are low in natural fertility. The organic matter content is moderate in the Enders soil and low in the Steprock soil. Reaction in the Enders soil is strongly acid or extremely acid throughout, and in the Steprock soil it is strongly acid to very strongly acid throughout. In the Enders soil the rooting zone is deep, but roots penetrate the clayey subsoil slowly. Because of the depth to bedrock in the Steprock soil, penetration of roots may be restricted. Some areas of both soils may be droughty.

Included with these soils in mapping and making up the remaining 10 percent of the unit are narrow areas of Mountainburg and Linker soils on benches and ridgetops, rock or shale outcrops, nearly vertical bluffs, and small drainageways. Also some areas of 10 to 20 acres have few or no stones on the surface.

The soils of this complex are unsuitable for cultivated crops or improved pasture and hay. The steep slopes and surface stones severely restrict the use of farm equipment. Runoff is rapid, and the hazard of erosion is very severe (fig. 4). Some of the less sloping areas can be used for native grass pasture if brush can be controlled; however, controlled grazing and fire protection are needed to maintain soil cover and prevent excessive erosion.

Figure 4.—The hazard of erosion is very severe in areas of Enders-Steprock complex, 12 to 30 percent slopes, where the soil cover has been removed.

These soils are moderately suited to woodland. Most of the acreage is used for this purpose. Adapted species include southern red oak, white oak, shortleaf pine, loblolly pine, and eastern redcedar. Stones and slopes are moderate limitations to the use of equipment in harvesting and managing the tree crop. The hazard of erosion is also a moderate limitation in management of these soils.

The Enders soil is poorly suited to most urban uses. Slopes and very slow permeability are severe limitations for septic tank filter fields. High shrink-swell potential and slope are severe limitations for small commerical buildings and dwellings. Low strength, slope, and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome. The Steprock soil also is poorly suited to most urban uses. Depth to bedrock and slope are severe limitations for septic tank filter fields. Slope is a severe limitation for dwellings, small commercial buildings, and local roads and streets. These limitations are difficult or impractical to overcome.

This complex is in capability unit VIIs-1 and woodland suitability group 4x2.

12—Gore silt loam, 1 to 3 percent slopes. This deep, moderately well drained, nearly level soil is on terraces that are generally on escarpments or sides of shallow valleys. Individual areas range from 20 to 100 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsurface layer is pale brown, mottled silt loam to a depth of about 9 inches. The subsoil extends to a depth of about 59 inches. To a depth of about 12 inches, it is reddish brown, mottled silt loam; to a depth of about 20 inches, it is red, mottled silty clay; to a depth of about 27 inches, it is mottled yellowish red, light brownish gray, and light yellowish brown silty clay; to a depth of about 36 inches, it is mottled red and light

brownish gray silty clay; and to a depth of 59 inches, it is gray, mottled silty clay. The underlying material is red, mottled clay to a depth of 72 inches or more.

Permeability is very slow, and the available water capacity is high. This soil is moderate in natural fertility and low in organic matter content. The surface layer and upper part of the subsoil are medium acid or strongly acid except where the surface layer has been limed or similarly affected by irrigation water. The lower part of the subsoil is strongly acid or very strongly acid. The rooting zone is deep but is somewhat restricted by the clayey subsoil.

Included with this soil in mapping are areas of a soil that has as much as 6 percent slope, a few severely eroded escarpments, a few small areas of Crowley and Jackport soils, soils that are similar to the Gore soil but have a thicker subsurface layer, and soils with less clay in the lower subsoil.

This Gore soil is poorly suited to cultivated crops, but some of the less sloping areas can be cultivated if erosion is controlled. Most of the acreage is cultivated. The principal crops are soybeans and grain sorghum (fig. 5). Rice is also grown, but space between levees is very close, and it is also difficult to remove water without causing excessive erosion. The hazard of erosion is severe, particularly where sheet and rill erosion has removed much of the original surface layer from the more sloping areas. Terraces and contour cultivation, minimum tillage, the use of cover crops, and inclusion of grasses and legumes in the cropping system reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Adapted

Figure 5.—Grain sorghum on Gore silt loam, 1 to 3 percent slopes.

pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, southern red oak, and white oak are adapted species. Moderate limitations to the use of equipment are caused by the clayey subsoil. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Very slow permeability is a severe limitation for septic tank filter fields. High shrink-swell potential is a severe limitation for dwellings and small commercial buildings. Low strength and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVe-2 and woodland suitability group 3c2.

13—Guthrie silt loam, 0 to 1 percent slopes. This deep, poorly drained, level soil is on upland flats and in depressions below the foot slopes of ridges. Individual areas range from 10 to 100 acres.

Typically, the surface layer is brown silt loam about 7 inches thick and is mottled in the lower part. The subsoil extends to a depth of about 72 inches. To a depth of about 24 inches, it is light gray, mottled silt loam, and below that it is a compact and brittle fragipan of gray, mottled silty clay loam that has wedges of silt loam material in the upper part.

Permeability is slow, and the available water capacity is medium. This soil receives seepage and runoff from adjacent slopes. The water table is perched and is within 0.5 to 1 foot of the surface from January through April. Some areas are ponded for short periods. This soil is low in natural fertility and organic matter content. It is very strongly acid or extremely acid throughout except where the surface layer has been limed. This soil has a compact, brittle fragipan at a depth of about 20 to 36 inches, which restricts penetration of roots and water movement through the soil.

Included with this soil in mapping are a few small, circular mounds. Also included are a few areas of intermingled Leadvale and Taft soils and narrow bands of Barling soils along small intermittent streams.

This Guthrie soil is moderately suited to cultivated crops. About one-half of the acreage is cleared and cultivated. The principal crops are soybeans and grain sorghum. Winter small grain can be grown where surface drainage is adequate. Excess surface water is a severe hazard, and farming may be delayed several days after a rain. Adequate surface drainage helps make farming operations more timely, and lessens restrictions on the choice of crops. Minimum tillage and proper management of crop residue reduce erosion and help maintain good tilth. This soil is moderately suited to pasture and hay. Adapted pasture plants include bermudagrass, tall fescue, white clover, and annual lespedeza. Seasonal wetness is the main limitation for pasture.

This soil is well suited to woodland. About one-half of it is used for this purpose. Loblolly pine, southern red oak, willow oak, and sweetgum are adapted species. Wetness is a severe limitation to the use of equipment, but this is easily overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is severe.

This soil is poorly suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness and rare flooding are severe limitations for dwellings and small commercial buildings. Low strength and wetness are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVw-2 and woodland suitability group 2w9.

14—Jackport silty clay loam, 0 to 1 percent slopes. This deep, poorly drained, level soil is in broad, flat areas and shallow depressions of terraces. Individual areas range from 20 to more than 300 acres.

Typically, the surface layer is dark grayish brown silty clay loam about 7 inches thick. The subsurface layer, to a depth of 13 inches, is light brownish gray, mottled silty clay loam. The subsoil extends to a depth of about 52 inches. To a depth of 31 inches, it is grayish brown, mottled clay, and below that it is grayish brown, mottled silty clay. The underlying material is grayish brown silty clay to a depth of 72 inches or more.

Permeability is very slow, and the available water capacity is high. The water table is perched and is within 1 foot of the surface from December through April. This soil is moderate in natural fertility and organic matter content. It is medium acid to very strongly acid in the surface layer except where it has been limed or similarly affected by irrigation water. The subsoil is strongly acid or very strongly acid in the upper part but ranges to mildly alkaline in the lower part. The underlying material ranges from slightly acid to mildly alkaline. The rooting zone is deep but is somewhat restricted by the clayey subsoil. This soil shrinks and cracks when dry, and when wet, it expands and the cracks seal.

Included with this soil in mapping are a few small areas of Crowley and Gore soils, small undulating areas of Jackport soils, and short escarpments.

This Jackport soil is moderately suited to cultivated crops. It is mostly used for this purpose. The principal crop is soybeans. Rice and grain sorghum are also commonly grown on this soil. Winter small grain can be grown where surface drainage is adequate. Excess surface water is a severe hazard, and farming operations may be delayed several days after a rain. The surface forms clods if plowed when wet, and seedbed preparation is difficult. Adequate surface drainage helps make farming operations more timely and lessens the restrictions on the choice of crops. Minimum tillage and proper management of crop residue reduce erosion and help maintain good tilth. This soil is moderately suited to

pasture and hay. Adapted pasture plants include bermudagrass, tall fescue, and white clover. Seasonal wetness is the main limitation for pasture.

This soil is well suited to woodland. Green ash, cherrybark oak, water oak, willow oak, and sweetgum are adapted species. Wetness is a severe limitation to the use of equipment, but this is easily overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. The very slow permeability and wetness are severe limitations for septic tank absorption fields. Wetness and high shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-3 and woodland suitability group 2w6.

15—Jackport silty clay loam, gently undulating. This deep, poorly drained, undulating soil is on shallow draws leading off of broad, flat terraces and on the intervening ridges. The draws are 200 to 1,000 feet apart and are 2 to 10 feet below the top of the ridges. Slope gradient is 0 to 3 percent. Individual areas range from about 20 to 100 acres.

Typically, the surface layer is dark grayish brown silty clay loam about 7 inches thick. The subsurface layer, to a depth of 13 inches, is light brownish gray, mottled silty clay loam. The subsoil extends to a depth of 52 inches. It is grayish brown, mottled clay and silty clay. The underlying material is grayish brown, mottled silty clay to a depth of 72 inches or more.

Permeability is very slow, and the available water capacity is high. The water table is perched and is within 1 foot of the surface from December through April. This soil is moderate in natural fertility and organic matter content. It is medium acid to very strongly acid in the surface layer except where it has been limed or similarly affected by irrigation water. The subsoil is strongly acid or very strongly acid in the upper part but ranges to mildly alkaline in the lower part. The underlying material ranges from slightly acid to mildly alkaline. The rooting zone is deep but is somewhat restricted by the clayey subsoil. This soil shrinks and cracks when dry, and when wet, it expands and the cracks seal.

Included with this soil in mapping are small areas of Crowley and Gore soils and soils similar to the Jackport soil that have silty clay throughout the subsoil. Also included are a few small areas similar to Jackport soils on escarpments that have slopes of more than 3 percent.

This Jackport soil is moderately suited to cultivated crops. It is mostly used for this purpose. The principal crop is soybeans. Rice and grain sorghum are also commonly grown on this soil. Winter small grain can be grown where the surface is drained. Excess surface water is a severe hazard, and the low spots stay wet several days after a rain causing fields to dry unevenly. Adequate drainage helps make farming operations more timely and lessens the restrictions on the choice of crops. If plowed when wet the surface layer tends to clod, and seedbed preparation is difficult. Minimum tillage and proper management of crop residue reduce erosion and maintain good tilth. This soil is moderately suited to pasture and hay. Wetness is the main limitation during the winter and early spring. Adapted pasture plants include common bermudagrass and tall fescue.

This soil is well suited to woodland. Green ash, cherrybark oak, water oak, willow oak, and sweetgum are adapted species. Wetness is a severe limitation to the use of equipment, but this is easily overcome by deferring the harvest or management of the tree crop to the drier seasons. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. The very slow permeability and wetness are severe limitations for septic tank absorption fields. Wetness and high shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-3 and woodland suitability group 2w6.

16—Kobel silty clay, frequently flooded. This poorly drained, level soil is on broad flats and in depressions that are in backswamp and slack water areas. Individual areas range from 50 to 10,000 acres.

Typically, the surface layer is dark grayish brown silty clay about 9 inches thick. The subsoil extends to a depth of about 72 inches. To a depth of about 45 inches, it is gray, mottled silty clay and below that it is dark gray, mottled silty clay.

Permeability is very slow, and the available water capacity is high. The water table is perched and is within 1 foot of the soil surface from December through April. Flooding occurs annually, but the duration of flooding is regulated by upstream impoundments which allow floodwaters to recede by normal planting dates in most years. This soil is high in natural fertility and moderate in organic matter content. It ranges from medium acid to neutral in the surface layer and from slightly acid to moderately alkaline in the subsoil. The rooting zone is deep. This soil shrinks and cracks when dry, and when wet, it expands and the cracks seal.

Included with this soil in mapping are a few small areas of Commerce and Robinsonville soils. Also included are small areas of a soil that is similar to the Kobel soil but is very strongly acid or strongly acid in the subsoil, and other small areas of a soil that has grayish brown or olive gray colors in the subsoil.

This Kobel soil is poorly suited to cultivated crops because of frequent flooding. Crops that require a short growing season can be grown in most years. The

principal crop is soybeans (fig. 6). Grain sorghum is grown in some of the highest areas where it can be planted early. Flooding often delays planting in some low areas, but most of the area can be planted by the usual planting dates and rarely later than June 15. In some years crops are harvested prematurely to avoid more extensive flood damage. Occasionally crops growing in a few of the lowest places are destroyed by fall flooding. Runoff is slow, and field drains may be needed in some areas to prevent ponding of surface water during the growing season. The surface forms clods if plowed when wet, and seedbed preparation is difficult. Minimum tillage and proper management of crop residue reduce erosion and help maintain good tilth. This soil is moderately suited to pasture and hay. Adapted pasture plants include bermudagrass and tall fescue. Seasonal wetness and flooding are the main limitations for pasture.

This soil is well suited to woodland. Most of the remaining wooded areas of this soil are in the Hurricane Lake Game Management Area. Green ash, American sycamore, eastern cottonwood, water hickory, and water oak are adapted species. Wetness and flooding are severe limitations to the use of equipment, but this can be overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is severe.

This soil is poorly suited to most urban uses. Flooding, wetness, and very slow permeability are severe limitations for septic tank filter fields. Flooding, wetness, and very high shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, and flooding are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVw-3 and woodland suitability group 3w6.

17—Leadvale silt loam, 1 to 3 percent slopes. This deep, moderately well drained, nearly level soil is

Figure 6.—Soybeans on Kobel silty clay, frequently flooded. Crops, such as soybeans, requiring a short growing season can be grown in most years.

dominantly on valley terraces. Individual areas range from 10 to more than 100 acres.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of about 72 inches. The upper part is strong brown friable silt loam about 10 inches thick and yellowish brown friable silty clay loam about 9 inches thick. The middle part, beginning at about 24 inches, is a firm, brittle fragipan of yellowish brown, mottled silty clay loam to a depth of about 47 inches. The lower part is yellowish brown, mottled silty clay loam.

Permeability is slow or moderately slow. The available water capacity is medium. The water table is perched and is within 2 or 3 feet of the surface from January through April. This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout. The fragipan restricts the penetration of roots and slows the movement of water through the soil but has little effect on productivity or the kind of plants that can be grown.

Included with this soil in mapping are small eroded areas; a few small areas of Enders, Guthrie, and Taft soils; and small areas of a soil that does not have a fragipan but has either partly weathered shale or clayey material in place of the fragipan within the subsoil. Also included are small areas where 10 to 15 percent shale fragments is in the upper part of the subsoil.

This Leadvale soil is well suited to cultivated crops. Most of it is used for this purpose. The principal crops are soybeans and grain sorghum. Corn and winter small grain are other suitable field crops. Strawberries and other fruit and truck crops adapted to the local climate are also grown on this soil. Erosion is a moderate hazard if cultivated crops are grown. Terraces, minimum tillage, proper management of crop residue, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, southern red oak, and white oak are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a moderate limitation for dwellings and small commerical buildings. Low strength and wetness are moderate limitations for local roads and streets. These limitations can generally be overcome by proper engineering design and drainage.

This soil is in capability group IIe-1 and woodland suitability group 3o7.

18—Leadvale silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is dominantly on toe slopes of ridges. Individual areas range from 10 to 100 acres or more.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of about 72 inches. The upper part is strong brown friable silt loam about 10 inches thick and yellowish brown friable silty clay loam about 9 inches thick. The middle part, beginning at about 24 inches, is a yellowish brown, mottled, firm and brittle, silty clay loam fragipan to a depth of about 47 inches. The lower part is yellowish brown, mottled silty clay loam.

Permeability is slow or moderately slow. The available water capacity is medium. The water table is perched and is within 2 or 3 feet of the surface from January through April. This soil is low in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout. The fragipan restricts the penetration of roots and slows the movement of water through the soil but has little effect on productivity or the choice of plants to be grown.

Included with this soil in mapping are small eroded areas, a few small areas of Enders and Taft soils, and small areas of a soil that does not have a fragipan but has either partly weathered shale or clayey material in place of the fragipan within the subsoil. Also included are small areas where 10 to 15 percent shale fragments is in the upper part of the subsoil.

This Leadvale soil is moderately suited to cultivated crops. On the small acreage that is cultivated, the principal crops are soybeans and grain sorghum. Corn and winter small grain are other suitable field crops. Strawberries and other fruit and truck crops adapted to the local climate are also grown on this soil. Runoff is rapid, and the hazard of erosion is severe. Under good management that includes adequate erosion control, clean-tilled crops can be safely grown in the less sloping areas. Terraces and contour cultivation, minimum tillage, proper management of crop residue, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Most of this soil is used for this purpose. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, southern red oak, and white oak are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a moderate limitation for dwellings. Wetness and slope are moderate limitations for small commercial buildings. Low strength and wetness are moderate limitations for local roads and streets. These limitations can generally be overcome by proper engineering design and drainage.

This soil is in capability unit IIIe-2 and woodland suitability group 3o7.

19—Linker fine sandy loam, 3 to 8 percent slopes. This moderately deep, well drained, gently sloping soil is on ridgetops, benches, some random toe slopes, and hillsides. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 32 inches. To a depth of 21 inches, it is yellowish red sandy clay loam, and to a depth of 32 inches, it is yellowish red, mottled gravelly fine sandy loam. Below this is horizontally bedded, weathered and hard sandstone bedrock.

Permeability is moderate, and the available water capacity is low. This soil is low in natural fertility and organic matter content. It is strongly acid to extremely acid throughout. Bedrock restricts rooting in some areas.

Included with this soil in mapping are a few small areas of a soil that has a gravelly surface layer and small areas of Enders, Mountainburg, Nauvoo, Sidon, and Steprock soils. Also included are small areas of soils similar to the Linker soil that are strong brown instead of yellowish red or red in the subsoil, soils that have more silt and less sand in the subsoil than Linker soils, and soils that are underlain by siltstone or shale instead of by sandstone bedrock.

This Linker soil is moderately suited to cultivated crops. On the small acreage that is cultivated, the principal crops are forage crops, grain sorghum, and soybeans. Winter small grain is another suitable field or forage crop. Strawberries and other fruit and truck crops (fig. 7) adapted to the local climate are also grown on this soil. Runoff is rapid, and the hazard of erosion is severe. Under good management that includes adequate erosion control, clean tilled crops can be safely grown in the less sloping areas. Terraces, minimum tillage, proper management of crop residue, the use of cover crops, and including grasses and legumes in the cropping system reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay, and most of it is used for this purpose. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

Figure 7.—Truck crops are well adapted to Linker fine sandy loam, 3 to 8 percent slopes. Squash is one of several truck crops grown on this soil.

This soil is moderately suited to woodland. Shortleaf pine, loblolly pine, southern red oak, white oak, and eastern redcedar are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Depth to bedrock is a severe limitation for septic tank filter fields. This limitation is difficult or impractical to overcome. Depth to bedrock is a moderate limitation for dwellings, small commercial buildings, and local roads and streets. Slope is also a moderate limitation for small commercial buildings.

This soil is in capability unit IIIe-1 and woodland suitability group 4o1.

20—Linker gravelly fine sandy loam, 3 to 8 percent slopes. This moderately deep, well drained, gently sloping soil is on hillsides, ridgetops, and benches. Individual areas range from about 10 to 400 acres.

Typically, the surface layer is yellowish brown gravelly fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 34 inches. To a depth of 12 inches, it is strong brown gravelly fine sandy loam; to a depth of 20 inches, it is yellowish red clay loam; and to a depth of 34 inches, it is yellowish red gravelly sandy clay loam. The underlying material is about 2 inches of strong brown weathered sandstone that grades to horizontally bedded hard sandstone bedrock.

Runoff is rapid. Permeability is moderate, and the available water capacity is low. This soil is low in natural fertility and organic matter content. It is strongly acid to extremely acid throughout. Bedrock restricts rooting in some areas.

Included with this soil in mapping are small areas of a soil that has flat fragments on the surface; other small areas without gravel in the surface layer; a few small areas of Enders, Mountainburg, and Nauvoo soils; and soils similar to the Linker soil that are underlain by hard siltstone or hard shale bedrock instead of sandstone.

This Linker soil is moderately suited to cultivated crops. On the small acreage that is cultivated, winter small grain and supplemental forage crops are the main crops. Strawberries and vegetable crops are grown on a few acres. Grain sorghum and soybeans are other suitable crops. In some included areas flat fragments may interfere with tillage equipment. Runoff is rapid, and the hazard of erosion is severe. Under good management that includes erosion control, clean tilled crops can be grown in the less sloping areas. Terraces and contour cultivation, minimum tillage, proper management of crop residue, the use of cover crops, and including grasses and legumes in the cropping system reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture or hay, and most cleared areas are used for this purpose. Adapted pasture plants include bahiagrass, bermudagrass, white clover, and annual and sericea lespedezas.

This soil is moderately suited to woodland. Loblolly pine, shortleaf pine, southern red oak, white oak, and eastern redcedar are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Depth to bedrock is a severe limitation for septic tank filter fields. This limitation is difficult or impractical to overcome. Depth to bedrock is a moderate limitation for dwellings, small commercial buildings, and local roads and streets. Slope is also a moderate limitation for small commercial buildings.

This soil is in capability unit IIIe-1 and woodland suitability group 4o1.

21—Loring silt loam, 1 to 3 percent slopes. This deep, moderately well drained, nearly level soil is on the higher parts of terraces. Individual areas range from about 10 to more than 200 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 72 inches. To a depth of 14 inches, it is strong brown friable silt loam, and to a depth of 26 inches, it is yellowish brown silty clay loam. Below that it is a firm, brittle fragipan. The upper 13 inches of the fragipan is yellowish brown, mottled silt loam, and the lower part is yellowish brown, mottled silty clay loam.

Permeability is moderately slow, and the available water capacity is medium. The water table is perched and is within 2 or 3 feet of the surface from December through March. This soil is moderate in natural fertility and low in organic matter content. The surface layer ranges from medium acid to strongly acid. The subsoil is strongly acid or very strongly acid. The fragipan restricts the penetration of roots and movement of water through the soil but has little effect on productivity or the kind of plants that can be grown.

Included with this soil in mapping are a few small areas of Calhoun and Calloway soils and soils similar to the Loring soil that have a thin layer of red and gray, mottled, plastic silty clay loam interfingering into the fragipan.

This Loring soil is well suited to cultivated crops, and most of it is used for this purpose. The principal crops are soybeans and grain sorghum. Cotton and corn are other suitable field crops. Strawberries and other fruit crops and truck crops adapted to the local climate are also grown on this soil. Rice is also grown on this soil, but the space between levees is very close, and it is also difficult to remove water without causing excessive erosion. Erosion is a moderate hazard but with adequate erosion control clean tilled crops can be safely grown. Terraces, minimum tillage, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth (fig. 8). This soil is well suited to pasture and hay. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

Figure 8.—Soybeans on Loring silt loam, 1 to 3 percent slopes. Minimum tillage has been used to reduce runoff and control erosion.

This soil is well suited to woodland. Cherrybark oak, southern red oak, water oak, loblolly pine, and sweetgum are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately to poorly suited to most urban uses. Wetness and moderately slow permeability are severe limitations for septic tank filter fields. Wetness is a moderate limitation for dwellings and small commerical buildings. Low strength is a severe limitation for local roads and streets. These limitations can generally be overcome by proper engineering design and drainage.

This soil is in capability unit IIe-1 and woodland suitability group 3o7.

22—Loring silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is on the higher parts of terraces and along escarpments. Individual areas range from about 10 to more than 100 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 72 inches. To a depth of 14 inches, it is brown, friable silt loam; and to a depth of 26 inches, it is strong brown silty clay loam. Below that it is a firm, brittle fragipan. The upper 13 inches of the fragipan is strong brown, mottled silt loam and the lower part is yellowish brown, mottled silty clay loam.

Permeability is moderately slow, and the available water capacity is medium. The water table is perched and is within 2 or 3 feet of the surface from December through March. This soil is moderate in natural fertility and low in organic matter content. The surface layer ranges from medium acid to strongly acid. The subsoil is strongly acid or very strongly acid. The fragipan restricts the penetration of roots and movement of water through the soil but has little effect on productivity or the kind of plants that can be grown.

Included with this soil in mapping are a few small areas of Calloway soils and soils similar to the Loring soil that have a thin layer of red and gray, mottled, plastic silty clay loam interfingering into the fragipan. Also included are small areas of Loring soils on escarpments where slope is steeper than 8 percent and a few severely eroded areas.

Figure 9.—Erosion is a severe hazard on Loring silt loam, 3 to 8 percent slopes.

This Loring soil is moderately suited to cultivated crops. Most of it is used for this purpose. The principal crops are grain sorghum and soybeans. Cotton and corn are other suitable field crops. Strawberries and other fruit and truck crops adapted to the local climate are grown on a small acreage. This soil is too sloping for efficient water management in growing rice. Runoff is rapid, and the hazard of erosion is severe (fig. 9). Under good management that includes adequate erosion control, clean-tilled crops can be safely grown in the less sloping areas. Terraces, minimum tillage, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Cherrybark oak, southern red oak, water oak, loblolly pine, and sweetgum are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately to poorly suited to most urban uses. Wetness and moderately slow permeability are severe limitations for septic tank filter fields. Wetness is a moderate limitation for dwellings and small commercial buildings. Slope is also a moderate limitation for small commercial buildings. Low strength is a severe limitation for local roads and streets. These limitations can generally be overcome by proper engineering design and drainage.

This soil is in capability unit IIIe-2 and woodland suitability group 3o7.

23—Mountainburg stony fine sandy loam, 3 to 12 percent slopes. This shallow, well drained, gently sloping and moderately sloping soil is on the rim of ridgetops and benches. Individual areas range from 20 to 100 acres.

Typically, the surface layer is brown stony fine sandy loam about 1 inch thick. The subsurface layer is dark yellowish brown stony fine sandy loam to a depth of 8 inches. The subsoil extends to a depth of about 18 inches. It is yellowish red very gravelly sandy clay loam that contains flat fragments and flagstones. Below that is bedrock.

Permeability is moderately rapid, and the available water capacity is very low. This soil is low in natural fertility and organic matter content. The surface layer ranges from medium acid to very strongly acid, and the subsoil ranges from strongly acid to very strongly acid. Bedrock limits the rooting zone to less than 20 inches.

Included with this soil in mapping are areas where slope is as much as 16 percent, rock outcrops, and small areas of Enders, Linker, and Steprock soils. Also included are other soils, similar to the Mountainburg soil, which either have fewer coarse fragments in the subsoil or do not have the accumulation of clay in the subsoil.

This Mountainburg soil is unsuitable for cultivated crops or improved pasture. It is droughty, and the stones on the surface severely restrict the use of farm equipment. This soil is moderately suited to native pasture and wildlife, and most of it is used for this. In many uncleared areas there is an understory of native grasses (fig. 10). Proper stocking, timely deferment of grazing, fire prevention, and brush control help to keep the native pasture and soil in good condition.

This soil is poorly suited to woodland. Shortleaf pine, eastern redcedar, and loblolly pine are adapted species. Stones on the surface are a severe limitation to the use of equipment for woodland use and management. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Depth to rock and large stones are severe limitations for septic tank filter fields, dwellings, small commercial buildings, and local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIs-2 and woodland suitability group 5x3.

24—Nauvoo fine sandy loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on ridgetops and hillsides. Individual areas range from about 10 to 100 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 41 inches. To a depth of about 13 inches, it is strong brown loam; to a depth of about 32

Figure 10.—Typical vegetation on Mountainburg stony fine sandy loam, 3 to 12 percent slopes.

inches, it is yellowish red loam that is mottled with strong brown in the lower part; and to a depth of 41 inches, it is yellowish red, mottled fine sandy loam. The underlying material is strong brown, mottled fine sandy loam that extends to rippable sandstone at a depth of about 50 inches.

Permeability is moderate, and the available water capacity is medium. This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Linker, Sidon, and Steprock soils and areas of this Nauvoo soil where slope is less than 3 percent.

This Nauvoo soil is moderately suited to cultivated crops. On the small acreage that is cultivated, the principal crops are cultivated forage crops, grain sorghum, and soybeans. Winter small grain is another suitable field or forage crop. Strawberries and other fruit and truck crops adapted to the local climate are also grown on this soil. Runoff is rapid, and the hazard of erosion is severe. Under good management, that includes adequate erosion control, clean-tilled crops can be safely grown in the less sloping areas. Terraces, contour cultivation, minimum tillage, proper management of crop residue, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, sweetgum, and southern red oak are adapted species. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Depth to rock and moderate permeability are moderate limitations for septic tank filter fields. There are no significant limitations for dwellings. Slope is a moderate limitation for small commercial buildings. Low strength is a moderate limitation for local roads and streets.

This soil is in capability unit IIIe-1 and woodland suitability group 2o7.

25—Nugent loamy fine sand, occasionally flooded. This deep, level, excessively drained soil is on natural levees mainly along Little Red River. Slopes are 0 to 1 percent. Individual areas range from about 5 to 100 acres.

Typically, the surface layer is brown loamy fine sand about 8 inches thick. The underlying material to a depth of 14 inches is brown fine sandy loam; to a depth of 29 inches, it is brown loamy sand with thin strata of yellowish brown sand; and to a depth of 72 inches or more, it is yellowish brown loamy sand.

Permeability is moderately rapid, and the available water capacity is low. Flooding, influenced by the rise and fall of the White River, occurs occasionally during late winter and early spring. This soil has a seasonal high water table at a depth of 3.5 to 6.0 feet during the winter and early spring. This soil is low in natural fertility and organic matter content. It is medium acid or slightly acid throughout. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of Rexor and Spadra soils, spots of sandy riverwash, and soils that have less sand in the subsoil than Nugent soils. Also included is a small area between Judsonia and Pangburn that is rarely flooded.

This Nugent soil is moderately suited to most cultivated crops. Most of the acreage has been cleared and is used for crops and pasture. It is a fair source of topsoil and a good source of road fill material. A small acreage is used as a turf grass nursery, and it is well suited to this specialty use. This soil is droughty, and high fertility levels are difficult to maintain. Because of occasional flooding during the winter and early spring, only warm-season crops can be safely grown. The main crop is soybeans. Other suitable crops are corn, grain sorghum, and watermelons. Wind erosion is a moderate hazard if the soil surface is without vegetation or crop residue. Minimum tillage and proper management of crop residue reduce wind erosion and help maintain good tilth. This soil is well suited to pasture and hay. Adapted pasture plants include bahiagrass, tall fescue, and sericea lespedeza.

This soil is well suited to woodland. Shortleaf pine, loblolly pine, sweetgum, and water oak are adapted species. The sandy surface is a moderate limitation to the use of equipment. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Flooding and wetness are severe limitations for septic tank filter fields. Flooding is a severe limitation for dwellings, small commercial buildings, and local roads and streets. These limitations are generally difficult or impractical to overcome.

This soil is in capability unit IIIs-1 and woodland suitability group 2s8.

26—Oaklimeter silt loam, frequently flooded. This deep, moderately well drained, level soil is on natural levees adjacent to stream channels. Individual areas range from about 20 to 200 acres or more. Slopes are 0 to 1 percent.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of about 72 inches. To a depth of 12 inches, it is brown, mottled silt loam; to a depth of 33 inches, it is yellowish brown, mottled silt loam; and below this it is gray, mottled silt loam.

Permeability is moderate, and the available water capacity is high. The water table is apparent and ranges from 1.5 to 2.5 feet below the surface from November through March. Flooding, influenced by the rise and fall of the White River, occurs annually, but the duration of flooding is regulated by upstream impoundments which

allow floodwaters to recede by normal planting dates in most years. This soil is moderate in natural fertility and organic matter content. It is strongly acid or very strongly acid throughout. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of Tichnor soils, soils closely similar to the Oaklimeter soil that have more sand in the lower part of the subsoil, soils without gray or grayish brown mottles within 30 inches of the surface, and soils that do not have a B horizon.

This Oaklimeter soil is poorly suited to cultivated crops because of frequent flooding. Crops that require a short growing season can be grown in most years. The principal crop is soybeans. Grain sorghum is grown in some of the highest areas where it can be planted early. Flooding often delays planting in some low areas, but most areas can be planted by the usual planting dates and rarely later than June 15. In some years crops are harvested prematurely to avoid more extensive flood damage. Occasionally crops growing in a few of the lowest places are damaged or destroyed by fall flooding. Runoff is slow, and field drains may be needed in some areas to prevent ponding of water during the growing season.

This soil is moderately suited to pasture and hay. Adapted pasture plants include bermudagrass and tall fescue. Seasonal wetness and flooding are the main limitations for pasture.

This soil is well suited to woodland. A few small tracts remain in woodland. Cherrybark oak, eastern cottonwood, green ash, loblolly pine, willow oak, and sweetgum are adapted species. Wetness and flooding are moderate limitations to the use of equipment, but this can be overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Flooding and wetness are severe limitations for septic tank filter fields, dwellings, and small commercial buildings. Flooding is a severe limitation for local roads and streets.

This soil is in capability unit IVw-1 and woodland suitability group 1w8.

27—Rexor silt loam, occasionally flooded. This deep, well drained, level soil is on the higher parts of old natural levees along the Little Red River, mainly in areas influenced by backwater from the White River. Individual areas range from about 5 to 300 acres. Slope is 0 to 1 percent.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 72 inches. To a depth of 46 inches, it is brown, mottled silty clay loam; and below that it is dark yellowish brown, mottled silt loam.

Permeability is moderate, and the available water capacity is high. The water table is apparent and ranges from 4 to 5 feet below the surface from November through May. Flooding, influenced by the rise and fall of the White River, occurs during late winter and early spring. This soil is moderate in natural fertility and organic matter content. It is medium acid to very strongly acid throughout except where the surface layer has been limed. The rooting zone is deep and easily penetrated by roots.

Included with this soil in mapping are small areas of a soil with a fine sandy loam or loam surface layer, a few undulating areas, small areas of Nugent soils, and soils with colors and textures similar to those of the Rexor soil but without a clay-enriched horizon. Also included is a small area between Pangburn and Judsonia that is rarely flooded.

This Rexor soil is moderately suited to cultivated crops, and most of it is used for this purpose. Because of occasional flooding during the period November to June only warm-season row crops can be safely grown. The principal crop is soybeans. Corn and grain sorghum are other suitable crops. Minimum tillage and proper management of crop residue help control erosion and maintain good tilth. This soil is well suited to pasture and hay. Adapted pasture plants include bermudagrass, tall fescue, and white clover.

This soil is well suited to woodland. Loblolly pine, white oak, and southern red oak are adapted species. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Flooding is a severe limitation for septic tank filter fields, dwellings, small commercial buildings, and local roads and streets. These limitations are impractical to overcome without major flood-control measures.

This soil is in capability unit IIw-1 and woodland suitability group 2o7.

28—Robinsonville fine sandy loam, frequently flooded. This deep, well drained, level soil is on natural levees adjacent to the White River. Individual areas range from 20 to 200 acres. Slope is 0 to 1 percent.

Typically, the surface layer is brown fine sandy loam about 6 inches thick. The underlying material extends to a depth of about 72 inches. To a depth of 14 inches, it is brown stratified fine sandy loam and loamy fine sand; to a depth of 21 inches, it is yellowish brown loamy fine sand; to a depth of 30 inches, it is brown, mottled fine sandy loam; and below that, it is brown, mottled silt loam.

Permeability is moderate to moderately rapid, and the available water capacity is high. Flooding usually occurs annually during the period January to April, but the duration of flooding is regulated by upstream impoundments which allow floodwaters to recede by normal planting dates in most years. This soil has a seasonal high water table at a depth of 4.0 to 6.0 feet during the late winter and early spring. This soil is high in natural fertility and low in organic matter content. It is

slightly acid to neutral throughout. The rooting zone is deep and easily penetrated by roots.

Included with this soil in mapping are areas of Robinsonville soils that have slopes of 1 to 3 percent and a few small areas of Commerce soils. Also included are areas of soils that have more sand and less clay in the upper 40 inches than the Robinsonville soil.

This Robinsonville soil is poorly suited to cultivated crops because of frequent flooding. Crops that require a short growing season can be grown in most years. It is also good topsoil and road fill material. Most of the acreage is cultivated. The principal crop is soybeans. Grain sorghum is grown in some of the highest areas where it can be planted early. Flooding often delays planting in some of the lowest areas, but most areas can be planted by the usual planting dates and rarely later than June 15. In some years crops are harvested prematurely to avoid more extensive flood damage. Occasionally crops growing in a few of the lowest places are damaged or destroyed by fall flooding. This soil is moderately suited to pasture and hay. Adapted pasture plants include bermudagrass and tall fescue. Seasonal flooding is the main limitation for pasture.

This soil is well suited to woodland. Green ash, American sycamore, eastern cottonwood, and pecan are adapted species. Flooding is a moderate limitation to the use of equipment, but this can be overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Flooding is a severe limitation for septic tank filter fields, dwellings, small commercial buildings, and local roads and streets. This limitation is difficult to overcome without major flood-control measures.

This soil is in capability unit IVw-1 and woodland suitability group 1w5.

29—Sidon loam, 1 to 3 percent slopes. This deep, moderately well drained, nearly level soil is on undulating ridgetops and broad benches. Individual areas are irregular in shape and range from about 10 to more than 200 acres.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil extends to a depth of about 53 inches. The upper part is friable clay loam about 7 inches thick and yellowish brown, friable clay loam about 12 inches thick. Beginning at a depth of about 25 inches, it is a fragipan of strong brown, mottled, firm and brittle clay loam to a depth of 41 inches; and below that it is strong brown, mottled clay loam to a depth of about 53 inches. Below that is horizontally bedded, hard sandstone bedrock.

Permeability is slow, and the available water capacity is medium. A perched water table is within 2 to 3 feet of the surface from January through April. This soil is low in natural fertility and organic matter content. It is strongly acid to extremely acid throughout. The fragipan restricts the penetration of roots and movement of water through the soil but has little effect on productivity or the kind of plants that can be grown.

Included with this soil in mapping are a few small areas of a soil with a silt loam or fine sandy loam surface texture and small areas of Enders, Leadvale, Linker, and Nauvoo soils. Also included are small areas of soils that are similar to the Sidon soil in the upper 24 to 35 inches but have a thick layer of silty clay instead of a fragipan.

This Sidon soil is well suited to cultivated crops. On the small acreage that is cultivated, the principal crops are soybeans and grain sorghum. Corn and winter small grains are other suitable field crops. Strawberries and other fruit and truck crops adapted to the local climate are also grown on this soil. Runoff is medium, and the hazard of erosion is moderate. Under good management that includes adequate erosion control, clean-tilled crops can be safely grown. Terraces and contour cultivation, minimum tillage, proper management of crop residue, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Most of this soil is used for this purpose. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, southern red oak, and white oak are adapted species. This soil has no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a moderate limitation for dwellings and small commercial buildings. Low strength and wetness are moderate limitations for local roads and streets. These limitations can generally be overcome by proper engineering design and drainage.

This soil is in capability unit IIe-1 and woodland suitability group 3o7.

30—Sidon loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is on undulating ridgetops and broad benches. Individual areas range from about 10 to 40 acres.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil extends to a depth of about 53 inches. To a depth of 25 inches, it is strong brown and yellowish brown, friable clay loam; to a depth of 41 inches, it is a firm, brittle fragipan of strong brown, mottled clay loam; and below this, it is strong brown, mottled clay loam. Below this is horizontally bedded, hard sandstone bedrock.

Permeability is slow, and the available water capacity is medium. A perched water table is within 2 to 3 feet of the surface during the period January through April. This soil is low in natural fertility and organic matter content. It is strongly acid to extremely acid throughout. The fragipan restricts the penetration of roots and movement of water through the soil but has little effect on productivity or the kind of plants that can be grown.

Included with this soil in mapping are areas of a soil that has a silt loam or fine sandy loam surface texture; a few small areas of Enders, Leadvale, and Linker soils; and small areas of a soil that is similar to the Sidon soil in the upper 24 to 36 inches, but has a thick layer of silty clay instead of a fragipan.

This Sidon soil is moderately suited to cultivated crops. On the small acreage that is cultivated, the principal crops are soybeans and grain sorghum. Corn and winter small grain are other suitable field crops. Strawberries and other fruit and truck crops adapted to the local climate are also grown on this soil. Runoff is rapid, and the hazard of erosion is severe. Under good management that includes adequate erosion control, clean-tilled crops can be safely grown in the less sloping areas. Terraces and contour cultivation, minimum tillage, proper management of crop residue, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. This soil is well suited to pasture and hay. Most of it is used for this purpose. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual and sericea lespedezas.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, southern red oak, and white oak are adapted species. It has no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a moderate limitation for dwellings. Wetness and slope are moderate limitations for small commercial buildings. Low strength and wetness are moderate limitations for local roads and streets. These limitations can generally be overcome by proper engineering design and drainage.

This soil is in capability unit IIIe-2 and woodland suitability group 3o7.

31—Spadra fine sandy loam, occasionally flooded. This deep, well drained, level soil is on older natural levees and low terraces. Individual areas range from about 10 to more than 200 acres. Slope is 0 to 1 percent.

Typically, the surface layer is brown fine sandy loam about 10 inches thick. The subsoil is brown, mottled loam that extends to a depth of about 41 inches. The underlying material is brown, mottled fine sandy loam to a depth of 72 inches or more.

Permeability is moderate, and the available water capacity is medium. This soil is low in natural fertility and organic matter content. Reaction ranges from medium acid to very strongly acid throughout. The rooting zone is deep and easily penetrated by roots.

Included with this soil in mapping are small areas of Barling, Nugent, and Rexor soils and soils similar to the Spadra soil that have less clay in the subsoil. Also included is a small area between Judsonia and Pangburn that is rarely flooded.

This Spadra soil is moderately suited to cultivated crops, and most of it is used for this purpose. Because of occasional flooding during the winter and early spring, only warm-season row crops can be safely grown. The principal crop is soybeans. Corn and grain sorghum are other suitable crops. Minimum tillage and proper management of crop residue help to control erosion and maintain good tilth. This soil is well suited to pasture and hay, and areas along the smaller streams are used mainly for this purpose. Adapted pasture plants include bermudagrass, tall fescue, and white clover.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, and southern red oak trees are adapted species. There are no significant limitations to woodland use and management.

This soil is poorly suited to most urban uses. Flooding is a severe limitation for septic tank filter fields, dwellings, small commercial buildings, and local roads and streets. This limitation is impractical to overcome without major flood-control measures.

This soil is in capability unit IIw-1 and woodland suitability group 2o7.

32—Steprock-Enders complex, 12 to 30 percent slopes. This complex consists of moderately steep and steep soils on sides of ridges. About 65 percent of this complex is moderately deep, well drained Steprock soils, and 25 percent is deep, well drained Enders soils. Generally the Steprock soils are in the more sloping areas near the tops of high ridges and on the upper part of the smaller ridges and draws within the ridges. Each soil is on long narrow bands that follow the contour of the landscape. Mapped areas range from 20 to 400 acres or more. These soils are so intermingled that they could not be shown separately at the scale selected for mapping.

Typically, the surface layer of the Steprock soil is about 1 inch of dark grayish brown very flaggy loam with flat fragments and flagstones lying on the surface. The subsurface layer, to a depth of 9 inches, is brown very flaggy loam and yellowish brown very flaggy fine sandy loam. The subsoil extends to a depth of about 28 inches. To a depth of 16 inches it is strong brown very gravelly loam embedded with flat fragments and flagstones, and below that it is yellowish red very gravelly loam. The underlying material is partly weathered sandstone.

Typically, the surface layer of the Enders soil is dark grayish brown and strong brown gravelly fine sandy loam about 8 inches thick. The subsoil extends to a depth of about 41 inches. To a depth of 12 inches, it is strong brown loam; to a depth of 34 inches, it is yellowish red silty clay that is mottled in shades of brown and red in the lower part; and below that it is variegated red, yellowish brown, and gray gravelly silty clay. The underlying material is partly weathered shale.

Permeability is moderate in the Steprock soil and very slow in the Enders soil. The available water capacity is low in the Steprock soil and medium in the Enders soil.

The Steprock and Enders soils are low in natural fertility. The organic matter content is low in the Steprock soil and moderate in the Enders soil. Reaction in the Steprock soil is strongly acid or very strongly acid throughout, and in the Enders soil it is strongly acid to extremely acid throughout. The rooting zone in the Steprock soil is restricted by bedrock in some areas. The rooting zone in the Enders soil is deep, but roots penetrate the clayey subsoil slowly.

Included with these soils in mapping and making up the remaining 10 percent of the unit are narrow areas of Mountainburg and Linker soils on benches and ridgetops, rock or shale outcrops, and near vertical bluffs and small drainageways. Also included are some areas of 10 to 20 acres which have only a few stones on the surface.

These soils are not suitable for cultivated crops or improved pasture and hay. The slopes and coarse fragments on the surface severely restrict the use of farm equipment. Runoff is rapid, and the hazard of erosion is very severe. Some of the less sloping areas can be used for native grass pasture if brush can be controlled; however, controlled grazing and fire protection are needed to maintain soil cover and prevent excessive erosion.

These soils are moderately suited to woodland. Most of the acreage is used for this purpose. Adapted species include southern red oak, white oak, shortleaf pine, loblolly pine, and eastern redcedar. Slope and the hazard of erosion are moderate limitations to the use of equipment in harvesting and managing the tree crop.

The Steprock soil is poorly suited to most urban uses. Depth to bedrock and slope are severe limitations for septic tank filter fields. Slope is a severe limitation for dwellings, small commercial buildings, and local roads and streets. The Enders soil also is poorly suited to most urban uses. Slope and very slow permeability are severe limitations for septic tank filter fields. High shrink-swell potential and slope are severe limitations for dwellings and small commercial buildings. Low strength, slope, and high shrink-swell potential are severe limitations for local roads and streets. These limitations are difficult or impractical to overcome.

These soils are in capability unit VIIe-1 and woodland suitability group 4r2.

33—Steprock-Linker complex, 3 to 8 percent slopes. This complex consists of soils on hillsides, low ridges, and side slopes. About 65 percent of this complex is moderately deep, well drained Steprock soils, and 20 percent is moderately deep, well drained Linker soils. Generally the Steprock soils are on the upper part of hillsides and low ridges, and the Linker soils are on the lower side slopes. Mapped areas range from about 10 to 100 acres. These soils are so intermingled that they could not be shown separately at the scale selected for mapping.

Typically, the surface layer of the Steprock soil is brown gravelly fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 28 inches. It is yellowish red very gravelly loam that is mottled with strong brown in the lower part. The underlying material is partly weathered siltstone, shale, and sandstone.

Typically, the surface layer of the Linker soil is yellowish brown gravelly fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 34 inches. To a depth of 12 inches, it is strong brown gravelly fine sandy loam; to a depth of 20 inches, it is yellowish red clay loam; and below that, it is yellowish red gravelly sandy clay loam. The underlying material is about 2 inches of strong brown weathered sandstone. Hard bedrock is at a depth of about 36 inches.

Permeability is moderate in the Steprock and Linker soils, and the available water capacity is low. Both soils are low in natural fertility and organic matter content. The Steprock soil is strongly acid or very strongly acid throughout, and the Linker soil is strongly acid to extremely acid throughout. In both soils the rooting zone is restricted by bedrock in some areas.

The remaining 15 percent of this complex is small areas of Steprock and Linker soils that do not have gravel in the surface layer and small areas of Enders, Leadvale, and Mountainburg soils.

These soils are moderately suited to cultivated crops. On the small acreage that is cultivated, winter small grain and supplemental forage crops are the principal crops. Strawberries and vegetable crops are grown on a few acres. Grain sorghum and soybeans are other suitable crops. In some included areas flat fragments on the surface may interfere with tillage equipment. Runoff is rapid, and the hazard of erosion is severe. Under good management that includes erosion control, clean-tilled crops can be grown in the less sloping areas. Terraces and contour cultivation, minimum tillage, proper management of crop residue, and the use of cover crops, including grasses and legumes in the cropping system, reduce runoff and help to control erosion and maintain good tilth. These soils are well suited to pasture and hay, and most cleared areas are used for this purpose. Adapted pasture plants include bahiagrass, bermudagrass, and annual and sericea lespedezas.

Steprock and Linker soils are moderately suited to woodland. Loblolly pine, shortleaf pine, (fig. 11) southern red oak, white oak, and eastern redcedar are adapted species. These soils have no significant limitations for woodland use and management.

The Steprock soil is moderately suited to most urban uses. Depth to rock is a severe limitation for septic tank filter fields. This limitation is difficult or impractical to overcome. Slope is a moderate limitation for small commercial buildings. Limitations are slight for dwellings and local roads and streets. The Linker soil is moderately suited to most urban uses. Depth to rock is a severe limitation for septic tank filter fields. This limitation is difficult or impractical to overcome. Depth to rock is a moderate limitation for dwellings and local roads and streets. Slope and depth to rock are moderate limitations for small commercial buildings.

Figure 11.—Shortleaf pine on Steprock-Linker complex, 3 to 8 percent slopes.

These soils are in capability unit IIIe-3, and woodland suitability group 4o1.

34—Steprock-Mountainburg complex, 8 to 12 percent slopes. This complex consists of soils on sides of ridges and hills and on benches. About 70 percent of this complex is moderately deep, well drained Steprock soils, and 20 percent is shallow, well drained Mountainburg soils. Generally the Steprock soils are on the lower side slopes of low ridges or hills, and the Mountainburg soils are on the upper side slopes and narrow benches. Mapped areas range from about 10 to 18 acres. These soils are so intermingled that they could not be shown separately at the scale selected for mapping.

Typically, the surface layer of the Steprock soil is brown gravelly fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 28 inches. It is yellowish red very gravelly loam that is mottled with strong brown in the lower part. The material beneath is partly weathered siltstone, shale, and sandstone.

Typically, the surface layer of the Mountainburg soil is brown gravelly fine sandy loam about 6 inches thick. The subsoil is yellowish red very gravelly loam that extends to bedrock at a depth of about 19 inches.

Permeability is moderate in the Steprock soil and moderately rapid in the Mountainburg soil. The available water capacity is low in both soils. Both soils are low in natural fertility and organic matter content. The Steprock soil is strongly acid or very strongly acid throughout. In the Mountainburg soil, the surface layer is medium acid to very strongly acid and the subsoil is strongly acid or very strongly acid. In the Steprock soil the rooting zone is restricted by bedrock in some areas, and in the Mountainburg soil bedrock limits the rooting zone to less than 20 inches.

The remaining 10 percent of this complex is small areas where the surface layer is very gravelly or stony and small areas of Enders and Linker soils.

These soils are poorly suited to cultivated crops. Runoff is rapid, and the erosion hazard is very severe. The slope and coarse fragments in the surface layer interfere with the use of equipment in tilling the soil. In places the surface layer is thin, and these soils are somewhat droughty as well. A small acreage is used for cultivated forage crops, soybeans, and grain sorghum. Under good management that includes erosion control, clean-tilled crops and sown crops can be grown in rotation with grasses and legumes. Terraces, contour cultivation, minimum tillage, the use of cover crops, and including grasses and legumes in the cropping system reduce runoff and help to control erosion and maintain good tilth. These soils are moderately suited to pasture and hay. Most of the cleared areas are used for this purpose. Adapted pasture plants include bahiagrass, bermudagrass, and annual and sericea lespedezas.

The Steprock soil is moderately suited to woodland. Loblolly pine, shortleaf pine, southern red oak, white oak, and eastern redcedar are adapted species. The Steprock soil has no significant limitations for woodland use and management. The Mountainburg soil is poorly suited to woodland. Loblolly pine, shortleaf pine, and eastern redcedar are adapted species. Seedling mortality is moderate.

The Steprock soil is moderately suited to most urban uses. Depth to rock, however, is a severe limitation for septic tank filter fields. This limitation is difficult or impractical to overcome. Slope is a moderate limitation for dwellings and local roads and streets and a severe limitation for small commercial buildings. The Mountainburg soil is poorly suited to most urban uses. Depth to rock is a severe limitation for septic tank filter fields, dwellings, and local roads and streets. Slope and depth to rock are severe limitations for small commercial buildings. These limitations are difficult or impractical to overcome.

These soils are in capability unit IVe-3. The woodland suitability group for the Steprock soil is 4o1 and for the Mountainburg soil is 5d2.

35—Taft silt loam, 0 to 2 percent slopes. This deep, somewhat poorly drained, level to nearly level soil is on small stream terraces and upland flats and in depressions. Generally, the slopes are concave and range from 0 to 2 percent. Individual areas range from about 20 to 100 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of about 72 inches. To a depth of 11 inches, it is yellowish brown, mottled silt-loam; to a depth of 20 inches, it is pale brown, mottled silt loam; to a depth of 22 inches, it is light brownish gray, mottled silt loam mixed with strong brown fragments of brittle material; and below that, it is a yellowish brown, mottled, compact and brittle, silty clay loam fragipan.

Permeability is slow, and the available water capacity is medium. A perched water table is within 1 or 2 feet of the surface from January through April. This soil is low in natural fertility and organic matter content. It ranges from strongly acid through extremely acid throughout except where the surface layer has been limed. The fragipan, at a depth of 20 to 30 inches, restricts the penetration of roots and slows water movement through the soil.

Included with this soil in mapping are small areas of Guthrie and Leadvale soils, a few circular mounds, and a soil that has red and gray silty clay at a depth of 2 or 3 feet.

This Taft soil is moderately suited to cultivated crops. The principal crops are grain sorghum and soybeans. Winter small grain is another suitable crop if surface drainage is adequate. Excess surface water is a severe hazard because runoff is slow and seepage is received from adjacent slopes. Farming operations are often delayed several days after a rain. Adequate surface drainage makes more timely farming possible and lessens restrictions on the choice of crops. Sheet and rill erosion caused by headwater from the adjacent steeper slopes, is a moderate hazard in a few areas. Diversions may be needed in some of these areas. Minimum tillage and the use of cover crops, including grasses and legumes in the cropping system, help to control erosion and maintain good tilth. This soil is moderately suited to pasture. Adapted pasture plants include bahiagrass, bermudagrass, tall fescue, (fig. 12) and white clover. Seasonal wetness is the main limitation for pasture.

This soil is well suited to woodland. Loblolly pine, shortleaf pine, sweetgum, and white oak are adapted species. Wetness is a moderate limitation to the use of equipment, but is easily overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Wetness and slow permeability are severe limitations for septic tank filter fields. Wetness is a severe limitation for small commercial buildings and dwellings. Low strength is a severe limitation for local roads and streets. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-4 and woodland suitability group 3w8.

36—Tichnor silt loam, frequently flooded. This deep, poorly drained, level soil is on flood plains adjacent to natural levees. Slopes are 0 to 1 percent. Individual areas range from about 20 to 200 acres or more.

Typically, the surface layer is grayish brown, mottled silt loam about 2 inches thick. The subsurface layer is light gray, mottled silt loam to a depth of about 22 inches. The subsoil is gray, mottled silty clay loam to a depth of 72 inches or more.

Permeability is slow, and the available water capacity is high. The water table is perched and is within 1 foot of the surface from December through May. Flooding, influenced by the rise and fall of the White River, occurs annually, but the duration of flooding is regulated by upstream impoundments which allow floodwaters to recede by normal planting dates in most years. This soil is moderate in natural fertility and low in organic matter content. It is strongly acid or very strongly acid throughout. The rooting zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of soils similar to the Tichnor soils except that they have vertical seams of gray silt in the subsoil, other soils with similar textures that are not as gray near the surface, small areas of marshes, and Bonn and Oaklimeter soils.

This Tichnor soil is poorly suited to cultivated crops because of frequent flooding. Crops that require a short growing season can be grown in most years, and a large part of the acreage has been cleared for this purpose. The principal crop is soybeans. Flooding often delays planting in some low areas, but most areas can be planted by the usual planting dates and rarely later than June 15. In some years crops are harvested prematurely to avoid more extensive flood damage. Occasionally crops growing in a few of the lowest places are damaged or destroyed by fall flooding. Runoff is slow, and field drains may be needed in some areas to prevent ponding of water during the growing season. This soil is moderately suited to pasture and hay.

Figure 12.—Fescue pasture recently clipped for hay on Taft silt loam, 0 to 2 percent slopes. The more sloping Leadvale soils are in the background.

Adapted pasture plants include bermudagrass and tall fescue. Seasonal wetness and flooding are the main limitations for pasture.

This soil is well suited to woodland. Cherrybark oak, eastern cottonwood, and sweetgum are adapted species. Wetness and flooding are severe limitations to the use of equipment, but this can be overcome by deferring the harvest or management of the tree crop to the drier season. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. Flooding, wetness, and slow permeability are severe limitations for septic tank filter fields. Flooding and wetness are severe limitations for dwellings, small commercial buildings, and local roads and streets. These limitations are generally difficult or impractical to overcome.

This soil is in capability unit IVw-4 and woodland suitability group 1w6.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

prime farmland

Prime farmland, as defined by the U. S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops to meet the Nations short- and long-range needs. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not in urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland generally has an adequate and dependable supply of moisture from precipitation or irrigation. It also has a favorable temperature and growing season and acceptable acidity or alkalinity. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 402,916 acres, or 60 percent, of White County is considered prime farmland. These soils are scattered throughout the county, but the largest area, about one-third of the county, lies to the east of U. S. Highway 67, and extends to the flood plains of the streams in the eastern and southern parts of the county. Prime farmland is of minor extent in units 1, 2, 7, 8, and 10 of the general soil map. It is of moderate extent in units 6 and 9, and of high extent in units 3, 4, and 5. Crops grown on these soils are soybeans, rice, grain sorghum, winter small grains, forage, fruit, and truck crops.

Expanding industrial and urban usage, particularly around the urban areas along U. S. Highway 67 and the Missouri Pacific Railroad, is reducing the prime farmland along these routes. This loss of prime farmland to other uses can only be regained for farming by extending row crop production into the western part of the county where the soils are generally more erodible, droughty, or difficult to cultivate, and, in many places, less productive. The increased costs of producing crops on these more marginal croplands increase annually, but increased development costs for other land uses are generally one time only. Preservation of prime farmland is an eternal land use and economic decision that will affect future generations.

Soil map units that make up prime farmland in White County are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the

back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

The map units in this list are prime farmland except where the use is urban or built-up land. Urban and built-up is any contigous unit of land 10 acres or more in size that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, public administrative sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures and spillways, shooting ranges, and so forth.

1—Allen fine sandy loam, 3 to 8 percent slopes
2—Barling silt loam, occasionally flooded
4—Calhoun silt loam, 0 to 1 percent slopes
5—Calloway silt loam, 0 to 1 percent slopes
7—Crowley silt loam, 0 to 1 percent slopes
13—Guthrie silt loam, 0 to 1 percent slopes (where drained)
14—Jackport silty clay loam, 0 to 1 percent slopes
15—Jackport silty clay loam, gently undulating
17—Leadvale silt loam, 1 to 3 percent slopes
19—Linker fine sandy loam, 3 to 8 percent slopes
20—Linker gravelly fine sandy loam, 3 to 8 percent slopes
21—Loring silt loam, 1 to 3 percent slopes
24—Nauvoo fine sandy loam, 3 to 8 percent slopes
27—Rexor silt loam, occasionally flooded
29—Sidon loam, 1 to 3 percent slopes
31—Spadra fine sandy loam, occasionally flooded
35—Taft silt loam, 0 to 2 percent slopes

crops and pasture

Tom Burkett, Agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to data collected by the White County Agriculture Extension Service and the Agricultural Stabilization and Conservation Service, White County had 198,000 acres of field crops during 1980. Approximately 137,000 acres of soybeans, 30,000 acres of rice, 18,000 acres of wheat, 10,000 acres of grain sorghum, and 3,000 acres of corn made up this total. A few additional acres were used for vegetables, small fruits, and orchards. About 120,500 acres were used for grazing. The acreage of rice has increased rapidly—more than other field crops. The increased acreage of cropland has reduced the acreage of pasture and woodland.

The soils in White County are well suited to most of the crops that are commonly grown in the state. They are also suited to increased production of crops if appropriate conservation methods are used. About half of the prime farmland is used for field crop production. Food production could also be increased by extending the latest crop production technology to all cropland in the county. This soil survey can help facilitate the application of such technology.

In the upland part of the county, most cleared areas are used for forage for livestock. Scattered farms grow small acreages of truck crops, orchard crops, and berries. Corn, small grain, soybeans, and grain sorghum are also grown. On the bottom land and terraces, most of the acreage is cleared and used for field crops.

In general, the soils in this county, except for the White River flood plain, are low in nitrogen, potassium, phosphorus, and calcium. Also, organic matter content is low in most areas. Many of the soils on uplands are poorly suited or not suited to intensive use because they are stony or flaggy, are shallow over bedrock, or have a high content of coarse fragments. The soils on bottom lands are limited by poor surface drainage or internal drainage and are subject to flooding. Some of the soils on terraces are also limited by poor surface drainage or poor internal drainage. Many of the soils on uplands and some of the soils on terraces that are otherwise suitable for cultivation are erodible.

Contour cultivation, vegetated waterways, and terraces are needed on sloping soils used for tilled crops. Row arrangement and surface drains are needed for dependable growth in wet areas.

Annual cover crops or grasses and legumes should be grown regularly if the erosion hazard is severe or if the crops grown leave only small amounts of residue. Crop residue should be shredded and spread evenly on the soil to provide protective cover and active organic matter. Tillage should be minimized to the extent that is practical for the soil and for the crop. If left bare, many soils tend to pack and crust over after periods of heavy rain, and other soils are susceptible to soil blowing. Growing cover crops and managing crop residue reduce erosion and help maintain good tilth.

The amount of fertilizer applied is generally determined by soil tests, the kind of crops grown, and past experience with crops and fertilization. On most soils, periodic applications of agricultural limestone, according to soil tests, are beneficial to most crops and are generally necessary for satisfactory growth of such crops as white clover.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIe-2. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Paul I. Brown, forester, Soil Conservation Service, helped prepare this section.

All of White County was originally covered with forest. Within this vast forest were scattered tracts of Savanna where open stands of trees had an understory of tall native grasses. In 1950, about 312,300 acres, or 46.8 percent of the county, was covered with trees (*5*). By 1978, land clearing for farming had reduced this acreage

to about 200,600 acres, or 30 percent of the county (*9*). This clearing trend reached a peak in the 1960's, and land use patterns now appear to be relatively stable.

Poor to fair stands of woodland can be found on ridges in the western portion of the county, with good stands occurring in the valleys, flatlands, and flood plains. White County's forest consists mostly of broadleaved trees, although needleleaved species occur on the uplands in the western part of the county. The major forest types in the county and the approximate acreages in each type are as follows: loblolly-shortleaf pine forest type, 5,900 acres; oak-pine type, 17,700 acres; oak-hickory type, 118,000 acres; and oak-gum-cypress type, 59,000 acres (*9*). About 16,000 acres of the county's woodland is contained within the Hurricane Lake Wildlife Refuge Area and is managed by the Arkansas Game and Fish Commission. The remaining forested acreage is owned by private, non-industrial owners.

The value of wood products in White County is significant but is well below its potential. In 1968, the volume of growing stock for all species was about 139.4 million cubic feet. Net annual growth for all species in the county was about 4.3 million cubic feet (*7*). Forest products produced in the county include pulpwood, crossties, posts, and sawlogs. The forests of White County are also valuable for livestock grazing, wildlife, recreation, natural beauty, and conservation of soil and water. This section explains how soils affect tree growth and management in the county.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the woodland suitability group symbol for each soil. Soils assigned the same woodland suitability group symbol require the same general management and have about the same potential productivity.

The first part of the *woodland suitability group symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

The third element in the symbol, a numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaf trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaf and broadleaf trees.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, age 35 years for American sycamore, and age 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water

impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

wildlife habitat

Paul M. Brady, biologist, Soil Conservation Service, helped prepare this section.

The mainly rural character of White County provides a variety of upland and lowland habitats for fish and wildlife. These include pastures, upland forests, bottom land hardwoods, cropland, swamps, idle fields, fencerows, creeks, rivers, ponds, and lakes.

The uplands, mainly in the western part of the county, are dominanted by forests and pastures, while the eastern part has more cropland and bottom land hardwoods.

Pasture is especially abundant in the uplands, and bermudagrass is by far the most abundant of the improved pasture grasses. Some fescue and bahiagrass pastures are also present, while certain native grasses such as broomsedge, little bluestem, and big bluestem are quite common to very abundant.

These pastures provide good food and cover for wildlife, such as white-tailed deer, bobwhite quail, cottontail, and certain songbirds, especially when surrounded by woodland, idle fields, and fencerows with complementing food and cover.

Larger tracts of forest are scattered throughout the uplands and along the White River, Des Arc Bayou, and Departee Creek. The Arkansas Game and Fish Commission owns about 16,000 acres, much of which is forest, in the Hurricane Lake Wildlife Management Area adjacent to the White River. This area provides hunting and fishing opportunities for a variety of fish and wildlife, especially for ducks and other waterfowl, deer, swamp rabbits, wild turkey, and squirrels.

Plant communities in the forests of White County are varied. Permanently flooded forested wetlands are generally dominated by cypress and tupelo gum. These areas provide permanent habitat for wood ducks, mink, beavers, muskrats, herons, egrets, and other wildlife requiring swamp environments.

Seasonally flooded bottom land hardwoods occur along the broad flood plains formed by the White River and the smaller flood plains formed by Des Arc Bayou, Departee Creek, and other streams. Major tree species include water oak, willow oak, Nuttal oak, and water hickory. These areas are highly productive wildlife habitats for white-tailed deer, fox, and gray squirrel, cottontail, swamp rabbit, beaver, mink, raccoon, opossum, wild turkey, wood duck, mallard, and a variety of other wildlife species.

Dominant tree species within the uplands include blackjack oak, post oak, black hickory, and winged elm on the driest sites. Southern red oak, white oak, and mockernut hickory are common species on moist upland slopes and loessial terraces. Along occasionally flooded, narrow flood plains of the uplands, red maple, river birch, American elm, sycamore, and cottonwood occur frequently. Cottontail rabbits, gray and fox squirrels,

white-tailed deer, and raccoon are among the most common game species found in the uplands.

Besides the major trees and grasses discussed, many other native plants in White County provide valuable food and/or cover for wildlife. These include woolly croton, panicgrass, partridgepea, ragweeds, tickclover, milkpea, annual lespedeza, greenbriers, paspalums, vetches, elderberry, and dogwoods.

Fields of soybeans, rice, grain sorghum, and other crops in the county supply important food for wildlife. These fields are especially valuable near their borders where forests, old fields, brushy fencerows, and other types of permanent cover adjoin the cropland.

Land use trends in recent years have been toward clearing woodland to get larger fields for crops and using "cleaner", more intensive farming methods leading to fewer fencerows, odd areas, and idle fields. These trends have decreased the diversity and interspersion of environments. Thus, the amount of food and cover for wildlife in the county is not only being reduced, but that which remians is of less value to wildlife where diversity and interspersion have been reduced.

Aquatic habitats are abundant in White County. There are 269 miles of streams, about 1,000 acres of ponds, and about 1,650 acres of lakes and reservoirs. Important sport fishes in these areas include largemouth, spotted, and white bass, channel and flathead catfish, bullheads, white and black crappie, bluegill, redear, green, and longear sunfish, carp, and buffalo.

The last survey of agricultural facilities in Arkansas, made in October 1978, listed 240 acres in commercial food or baitfish production in White County.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, rice, grain sorghum, wheat, and oats.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bahiagrass, improved bermudagrass, common bermudagrass, and lespedeza.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, tickclover, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, tulip, poplar, black cherry, sweetgum, hawthorn, dogwood, hickory, blackberry, and huckleberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland

plants are smartweed, wild millet, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

James L. Janski, assistant state conservation engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves,

utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

sanitary facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of

landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches

of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large

stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent.

Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity,

infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion

environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

physical and chemical analyses of selected soils

The results of physical analysis of several typical pedons in the survey area are given in table 16 and the results of chemical analysis in table 17. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil series and their morphology." Soil samples were analyzed by the University of Arkansas at Fayetteville, Arkansas.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows, except the particle size distribution of silt and clay was determined by the hydrometer method (*3*). The codes in parentheses refer to published methods (*6*).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).
Organic carbon—dry combustion (6A2b).
Extractable acidity—barium chloride-triethanolamine I (6H1a).
Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Reaction (pH)—1:1 water dilution (8C1a).
Soluble ions—flame photometry; sodium (6P1a), potassium (6Q1a).
Soluble ions—atomic absorption; calcium (6N1b), magnesium (6O1b).

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 18, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aqualf (*Aqu*, meaning water (wetness), plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalf (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that have an udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, siliceous, thermic, Ultic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*4*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Allen series

The Allen series consists of deep, well drained, moderately permeable soils on hillsides and foot slopes of ridges. These gently sloping soils formed in thick loamy alluvial or colluvial material. The native vegetation was mixed hardwood and pine forests. Slopes range from 3 to 8 percent.

Allen soils are geographically associated with Sidon and Linker soils. Sidon soils, which are on the lower parts of hillsides, have a fragipan. Linker soils, which are on the higher parts of the landscape, are less than 40 inches deep to bedrock.

Typical pedon of Allen fine sandy loam, 3 to 8 percent slopes, in a pasture SW1/4SW1/4NW1/4, of sec. 18, T. 9 N., R. 4 W.

Ap—0 to 4 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many rocts; neutral; clear smooth boundary.

B1—4 to 9 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; common roots; slightly acid; clear smooth boundary.

B21t—9 to 18 inches; yellowish red (5YR 5/8) loam; weak medium subangular blocky structure; friable; few roots; few pores; many patchy thin clay films on faces of peds; very strongly acid; clear smooth boundary.

B22t—18 to 25 inches; yellowish red (5YR 5/8) loam; moderate medium subangular blocky structure; friable; few roots; few pores; ped interiors are strong brown (7.5YR 5/6); continuous thin clay films on faces of peds; very strongly acid; clear smooth boundary.

B23t—25 to 40 inches; red (2.5YR 4/6) clay loam; many medium and coarse yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; continuous medium clay films on faces of peds; thin patches of uncoated sand grains along vertical faces of some peds; very strongly acid; clear smooth boundary.

B24t—40 to 72 inches; red (2.5YR 4/6) clay loam; many medium and coarse yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; continuous thick gray clay films on vertical faces of some peds; patches of uncoated sand grains associated with clay films; about 5 percent gravel up to 1 inch in diameter; very strongly acid.

The thickness of the solum ranges from 60 to 80 inches or more. Where the soil has not been limed, reaction of each horizon is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It ranges from 4 to 12 inches in thickness. The B1 horizon has hue of 10YR, 7.5YR, or 5YR; value of 5; and chroma of 4, 6, or 8. Texture is loam or fine sandy loam. The B21t and B22t horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is loam, clay loam, or sandy clay loam. The B23t and B24t horizons are similar in matrix colors to the B21t and B22t horizons, but they have common to many mottles in shades of yellow, red, and brown. Texture is loam, sandy clay loam, or clay loam in the B23t horizon and clay loam, sandy clay, or clay in the B24t horizon.

Barling series

The Barling series consists of deep, moderately well drained, moderately permeable soils on flood plains of streams that flow through the uplands. These level soils formed in loamy alluvial material high in content of silt that weathered from siltstone, shale, and sandstone. The native vegetation was mixed hardwood forests. These soils are occasionally flooded during the winter and early spring, and the seasonal water table is within 1 foot to 4 feet of the soil surface during the same period. Slopes are 0 to 1 percent.

Barling soils are geographically associated with Guthrie and Spadra soils. Guthrie soils, which are farther from streams than Barling soils, are poorly drained and have a fragipan. Spadra soils, which are farther upstream or on slightly higher terraces, have a fine-loamy control section and an argillic horizon.

Typical pedon of Barling silt loam, occasionally flooded, in a soybean field NW1/4SE1/4SW1/4 of sec. 32, T. 6 N., R. 8 W.

Ap1—0 to 4 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium granular structure; friable; common fine roots; few fine dark concretions; strongly acid; abrupt smooth boundary.

Ap2—4 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct brown (10YR 5/3) and few fine distinct grayish brown mottles; weak medium subangular blocky structure; friable; common fine roots; few fine dark concretions and soft masses; strongly acid; clear smooth boundary.

B1—8 to 18 inches; brown (10YR 4/3) silt loam; many fine faint dark yellowish brown and few fine distinct light brownish gray mottles; weak medium subangular blocky structure; friable; few fine roots and pores; few soft masses; strongly acid; gradual smooth boundary.

B21—18 to 34 inches; brown (10YR 4/3) silt loam; common medium faint brown (10YR 5/3) and few fine faint light brownish gray mottles; weak medium subangular blocky structure; friable; few fine roots; common medium pores; common fine and medium dark concretions and soft masses; very strongly acid; gradual smooth boundary.

B22—34 to 46 inches; pale brown (10YR 6/3) silt loam; common medium faint brown (10YR 5/3) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; common fine and medium dark concretions and soft masses; very strongly acid; gradual smooth boundary.

B23—46 to 72 inches; mottled gray (10YR 6/1), light brownish gray (10YR 6/2), pale brown (10YR 6/3), and yellowish brown (10YR 5/8) silt loam; weak medium subangular blocky structure; friable; many fine and medium dark concretions and soft masses; very strongly acid.

The thickness of the solum ranges from 60 to 72 inches or more. Reaction of the A horizon is medium acid or strongly acid. Reaction of the B horizon is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2, 3, or 4. The A horizon is 4 to 12 inches thick. The B1 and B21 horizons have hue of 10YR, value of 4, and chroma of 3 or 4. The B22 and subsequent B2 horizons have hue of 10YR; value of 4, 5, or 6; and chroma of 3, 4, or 6 and are mottled in shades of gray. Some pedons, below a depth of 30 inches, have hue of 10YR, value of 6, and chroma of 1 or 2 and are mottled in shades of brown or in shades of these colors.

Bonn series

The Bonn series consists of deep, poorly drained, very slowly permeable soil on low terraces. These level soils formed in thick loamy deposits of loess. The native vegetation was poor quality, water-tolerant hardwood trees. These soils have a natric horizon within 16 inches of the surface that limits rooting depth and available water capacity. A seasonal perched water table is within 2 feet of the soil surface during the winter and spring. Slopes are 0 to 1 percent.

Bonn soils are geographically associated with Calhoun and Tichnor soils. Calhoun soils, which are at higher elevations than Bonn soils, and Tichnor soils, which are on lower lying flood plains, do not have a natric horizon.

Typical pedon of Bonn silt loam, 0 to 1 percent slopes, in a cultivated area SE1/4NE1/4NE1/4 of sec. 27, T. 5 N., R. 8 W.

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A2—5 to 9 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; neutral; gradual smooth boundary.

A&B—9 to 14 inches; light gray (10YR 7/1) silt loam; weak medium columnar structure; friable; about 30 percent of horizon is light brownish gray (2.5Y 6/2) B masses; A material between some B masses is platy lenses of silt and silty clay loam; few fine roots and pores; many fine and medium dark brown and black stains and accumulations; moderately alkaline; gradual wavy boundary.

B21tg&A—14 to 24 inches; light brownish gray (2.5Y 6/2) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine roots and pores; common dark brown and black stains and accumulations; tongues of light gray (10YR 7/1) A material about 2 inches wide extend through the horizon; patchy distinct clay films and thin silt coatings on faces of prisms; moderately alkaline; clear wavy boundary.

B22tg—24 to 36 inches; light brownish gray (2.5Y 6/2) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots and pores; common dark brown stains and accumulations; continuous distinct clay films; silt coatings on prism faces; moderately alkaline; gradual wavy boundary.

B23tg—36 to 55 inches; light brownish gray (2.5Y 6/2) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common old root channels surrounded by dark brown stains; few pores; patchy distinct clay films; few pockets of gray silt between prisms; moderately alkaline; gradual wavy boundary.

B3—55 to 72 inches; light brownish gray (2.5Y 6/2) silt loam; weak coarse prismatic structure; firm; prisms are separated by veins of gray silt and silty clay loam; common fine old root channels surrounded by dark brown stains; moderately alkaline.

The thickness of the solum ranges from 60 to 72 inches or more. Reaction ranges from medium acid to neutral in the A horizon and from neutral to moderately alkaline in the B horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The A2 horizon has hue of 10YR; value of 5, 6, or 7; and chroma of 1 or 2. The thickness of the A horizon is 8 to 18 inches. The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2, or it has hue of 2.5Y, value of 6, and chroma of 2. Texture is silt loam or silty clay loam. None to common, fine and medium mottles in shades of yellow and brown are throughout the horizon. The C horizon, if there is one, has colors and textures similar to those of the B horizon. Reaction is neutral to strongly alkaline.

Calhoun series

The Calhoun series consists of deep, poorly drained, slowly permeable soils in flat and depressed areas of terraces. These level soils formed in thick loamy loessial deposits. The native vegetation is mixed water-tolerant hardwood forests. A perched water table is within 2 feet of the surface from early winter through midspring. Slopes are 0 to 1 percent.

Calhoun soils are geographically associated with Calloway, Loring, and Bonn soils. Both Calloway and Loring soils, which are at slightly higher elevations than Calhoun soils, have fragipans. In addition, Calloway soils are somewhat poorly drained and Loring soils are moderately well drained. Bonn soils, which occur near Cypress Bayou, are at lower elevations and have a natric horizon.

Typical pedon of Calhoun silt loam, 0 to 1 percent slopes, in a rice-soybean field SW1/4SW1/4SW1/4 of sec. 5, T. 6 N., R. 6 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common roots; common dark concretions; neutral; abrupt smooth boundary.

A2g—6 to 14 inches; gray (10YR 6/1) silt loam; common medium distinct brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few roots; many pores; common black and brown soft iron-manganese masses; common red root stains; very strongly acid; clear wavy boundary.

B21tg—14 to 29 inches; gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/6) and faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few roots between prism faces; common pores; few vertical and horizontal seams of silt; few tongues of horizontal lenses of silt; common patchy clay films; very strongly acid; clear wavy boundary.

B22tg—29 to 40 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct yellowish brown mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few roots on prism faces; common pores; few tubular pockets of platy silt extend through the horizon; thick continuous clay films on faces of peds; clay films 1/4 to 1/2 inch in diameter form nearly continuous band along lower boundary of horizon; very strongly acid; abrupt irregular boundary.

B23tg—40 to 55 inches; gray (10YR 6/1) silt loam; common medium and coarse distinct yellowish brown (10YR 5/4, 5/6) and brown (10YR 5/3) mottles; weak coarse prismatic structure parting to weak fine and medium angular blocky; firm, hard; few roots; common pores lined with clay films; thick continuous clay films on vertical faces of prisms; about 20 percent of horizon is wedges of material from above horizon; very strongly acid; gradual smooth boundary.

B24tg—55 to 72 inches; gray (10YR 6/1) silty clay loam; common fine to coarse distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak fine and medium angular blocky; firm, hard; few roots between prisms; few pores; thick continuous clay films on faces of peds; very strongly acid.

The thickness of the solum is more than 72 inches. Reaction is strongly acid or very strongly acid throughout the solum except where the surface layer has been limed or similarly affected by irrigation water.

The Ap and A1 horizons have hue of 10YR, value of 4 or 5, and chroma of 2. The A2 horizon has hue of 10YR; value of 5, 6, or 7; and chroma of 1 or 2. It has few to common mottles in shades of yellow and brown. The A horizon is 12 to 24 inches thick. The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It has few to many mottles in shades of yellow and brown. The B horizon is silt loam or silty clay loam.

Calloway series

The Calloway series consists of deep, somewhat poorly drained, slowly permeable soils on broad flat areas of terraces. These level soils formed in thick loamy loessial deposits. The native vegetation was mixed hardwood forests. These soils have a fragipan in the lower part of the subsoil. A perched water table is within 1 foot to 2 feet of the surface from midwinter to midspring. Slopes are 0 to 1 percent.

Calloway soils are geographically associated with Calhoun and Loring soils. Calhoun soils, which are at lower elevations on the landscape than the Calloway soils, do not have a fragipan and are poorly drained. Loring soils, which are at higher elevations, have an argillic horizon above the fragipan and are moderately well drained.

Typical pedon of Calloway silt loam, 0 to 1 percent slopes, in a moist, cultivated area NE1/4NW1/4NE1/4 of sec. 2, T. 8 N., R. 5 W.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; many fine roots; few fine dark concretions; neutral; abrupt smooth boundary.

A2—6 to 8 inches; pale brown (10YR 6/3) silt loam; common fine faint grayish brown and yellowish brown mottles; weak fine subangular blocky structure; friable; common fine roots; few fine pores; few fine dark concretions; medium acid; gradual wavy boundary.

B&A—8 to 24 inches; yellowish brown (10YR 5/6) silt loam; many medium distinct light brownish gray (10YR 6/2) and few medium distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; common fine pores; few fine dark concretions; thin patchy coatings of clean silt between faces of peds; very strongly acid; gradual wavy boundary.

A'2—24 to 29 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/4, 5/6, 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few pores; few fragments of brittle material throughout the mass increasing in the lower part, common nonbrittle fragments with clay films on faces and in pores; very strongly acid; gradual irregular boundary.

B'x1—29 to 48 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; prisms of brittle material have a mean width greater than 4 inches and comprise about 60 percent of the cross section; few roots in nonbrittle material between prisms and

in upper 6 inches between peds; common fine pores lined with clay films; continuous distinct clay films on vertical faces of prisms and on some secondary peds; continuous horizontal clay films extend through prisms in the upper 6 inches of horizon; vertical veins of silt and silty clay loam 1/4 to 1 inch wide at 3- to 7-inch intervals separate prisms; wedges of gray silt about 3 inches wide at 12- to 24-inch intervals extend part way through horizon; few tubular pockets of silt surrounded by clay films 1 inch to 2 inches in diameter extend through the horizon; very strongly acid; gradual smooth boundary.

B'x2—48 to 72 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct gray (10YR 6/1) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; firm, compact and brittle; prisms have a mean width of 4 inches 2 to 6 inches wide and comprise about 70 percent of the cross section; common fine pores lined with clay films; continuous distinct clay films on faces of prisms and vertical faces of secondary peds; thin silt coatings on faces of peds; patchy black stains on faces of some peds; strongly acid.

The solum is more than 72 inches thick. Depth to the fragipan is 24 to 38 inches. Reaction ranges from medium acid to very strongly acid in the upper part of the solum except where the surface layer has been limed or similarly affected by irrigation water. Reaction of the lower part of the solum is medium acid or strongly acid.

The Ap horizon is 6 to 8 inches thick. It has hue of 10YR, value of 4, and chroma of 2; or it has value of 5 and chroma of 2 or 3. The A2 horizon, if there is one, has hue of 10YR, with value of 5 and chroma of 2 or 3 or value of 6 and chroma of 3 or 4. The B&A horizon has hue of 10YR, value of 5, and chroma of 4 or 6. It has few to many mottles in shades of gray and brown. The A'2 horizon has hue of 10YR, value of 7, and chroma of 1 or 2. The B'x horizon has hue of 10YR, value of 5, and chroma of 4 or 6. It has few to many mottles and streaks in shades of gray. Texture is silt loam or silty clay loam.

Commerce series

The Commerce series consists of deep, somewhat poorly drained, moderately slowly permeable soils. These soils formed in thick loamy alluvial material on alluvial plains and natural levees along the White River. They are frequently flooded during the winter and spring, and the water table is within 1.5 to 4 feet of the surface during the same period. The native vegetation was mixed hardwood forests. Slopes are 0 to 1 percent.

Commerce soils are geographically associated with Robinsonville and Kobel soils. Robinsonville soils, which are on nearby natural levees, have a coarse-loamy control section and do not have a B horizon. Kobel soils, which are generally in backswamp or slack water areas, have a fine control section.

Typical pedon of Commerce silty clay loam, frequently flooded, in a cultivated field SW1/4SW1/4SE1/4 of sec. 29, T. 6 N., R. 4 W.

Ap—0 to 4 inches; brown (10YR 4/3) silty clay loam; weak fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

B21—4 to 15 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct brown (10YR 4/3) and few fine distinct gray mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few pores; few soft black masses; slightly acid; gradual smooth boundary.

B22—15 to 32 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine and medium distinct brown (10YR 4/3) and gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; few roots; common pores and worm holes; few soft black masses; slightly acid; clear smooth boundary.

C—32 to 72 inches; dark gray (10YR 4/1) silty clay; common fine and medium distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; peds have shiny faces; few soft black masses; neutral.

The thickness of the solum ranges from 20 to 40 inches. Reaction ranges from medium acid to neutral in the A horizon, slightly acid to neutral in the B horizon, and neutral to mildly alkaline in the C horizon.

The A horizon is 4 to 10 inches thick. It has hue of 10YR, value of 4, and chroma of 1, 2, or 3. The B21 horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The B22 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. There are few to many mottles throughout the B horizon in shades of brown and gray. Texture is silt loam or silty clay loam. The C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It has common to many mottles in shades of brown. Texture is silt loam, silty clay loam, or silty clay.

Crowley series

The Crowley series consists of deep, somewhat poorly drained, very slowly permeable soils in broad, flat areas of terraces. These level soils formed in loamy and clayey loessial and alluvial material. The native vegetation was mixed hardwood forests. A perched water table is within 0.5 to 1.5 feet of the surface during the winter and early spring. Slopes are 0 to 1 percent.

Crowley soils are geographically associated with Jackport and Gore soils. Jackport soils, which are at slightly lower elevations than Crowley soils, do not have an abrupt textural change and have vertic properties. Gore soils, which are on escarpments and side slopes, are moderately well drained and have vertic properties.

Typical pedon of Crowley silt loam, 0 to 1 percent slopes, in a rice-soybean field NW1/4NW1/4NW1/4 of sec. 23, T. 5 N., R. 6 W.

Ap1—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint grayish brown and brown mottles; weak fine granular structure; friable; common fine roots; few fine dark concretions; mildly alkaline; abrupt smooth boundary.

Ap2—5 to 8 inches; gray (10YR 5/1) silt loam; many fine and medium distinct brown (10YR 4/3) and common fine faint grayish brown mottles; weak medium subangular blocky structure; friable; many fine roots; few fine dark concretions; mildly alkaline; clear smooth boundary.

A2g—8 to 21 inches; gray (10YR 6/1) silt loam; few fine distinct dark yellowish brown mottles and many fine prominent yellowish red root stains; weak medium subangular blocky structure; friable; few fine roots; common pores; few medium concretions; strongly acid; abrupt wavy boundary.

B21tg—21 to 38 inches; gray (10YR 5/1) silty clay; many fine and medium prominent red (2.5YR 4/8, 5/8) mottles; moderate fine angular blocky structure; firm; continuous clay films; some peds coated with silt less than 1 millimeter thick in the upper part of the horizon; very strongly acid; gradual wavy boundary.

B22tg—38 to 60 inches; gray (10YR 5/1) silty clay; many fine and medium distinct yellowish brown (10YR 5/4, 5/6) mottles; moderate medium subangular blocky structure; firm; many patchy thin clay films; few vertical seams of silt about 1/2 inch wide; very strongly acid; gradual wavy boundary.

B23tg—60 to 72 inches; gray (10YR 6/1) silty clay; many fine and medium yellowish brown (10YR 5/4, 5/6) mottles; weak medium subangular blocky structure; firm; common patchy thin clay films; common black stains and accumulations; medium acid.

The thickness of the solum ranges from 50 to 72 inches or more. Depth to the abrupt textural change ranges from 12 to 25 inches. Reaction of the A horizon ranges from medium acid to very strongly acid except where it has been limed or similarly affected by irrigation water. Reaction of the B2t horizon ranges from very strongly acid to slightly acid, and reaction of the B3 horizon ranges from medium acid to moderately alkaline.

The Ap or A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. The A2g horizon has hue of 10YR with value of 5 and chroma of 1 or 2 or value of 6 and chroma of 1. The A horizon is 12 to 25 inches thick. The Bt horizon has hue of 10YR with value of 5 or 6 and chroma of 1 or value of 5 and chroma of 2. It has common to many mottles in shades of red and brown. The B3 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It has few to many mottles in shades of red or brown. Texture of the B horizon is silty clay or silty clay loam.

Enders series

The Enders series consists of deep, well drained, very slowly permeable soils on sides and foot slopes of ridges. These gently sloping to steep soils formed in a thin layer of loamy material and in the underlying clayey residual material weathered from shale or interbedded shale, siltstone, and sandstone. The native vegetation was mixed hardwood and pine forests. Slopes range from 3 to 30 percent.

Enders soils are geographically associated with Leadvale, Linker, Mountainburg, Sidon, and Steprock soils. Leadvale soils, which are on lower lying toe slopes, have a fragipan and a fine-silty control section. Linker soils, which are on benches and ridgetops, are 40 inches or less deep to bedrock and have a fine-loamy control section. Mountainburg soils, which are along the rims of benches and tops of ridges, are less than 20 inches deep to bedrock and have a loamy-skeletal control section. Sidon soils, which are on ridgetops and broad benches, have a fragipan and a fine-loamy control section. Steprock soils, which are generally upslope and are intermingled with Enders soils in some areas, have a loamy-skeletal control section.

Typical pedon of Enders stony fine sandy loam, from a wooded area of Enders-Steprock complex, 12 to 30 percent slopes, NE1/4SE1/4NE1/4 of sec. 31, T. 8 N., R. 7 W.

O1—1 inch to 0; litter of leaves and twigs.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak fine granular structure; very friable; many fine roots; about 25 percent by volume fragments of shale and sandstone; about 2 percent of the surface covered with flagstones and boulders; strongly acid; clear wavy boundary.

A12—3 to 9 inches; strong brown (7.5YR 5/6) stony fine sandy loam; weak medium granular structure; very friable; many fine roots; about 20 percent by volume fragments of shale and sandstone; extremely acid; clear wavy boundary.

B1—9 to 13 inches; strong brown (7.5YR 5/8) loam; weak medium subangular blocky structure; friable; common fine and medium roots; about 10 percent by volume fragments of shale and sandstone; extremely acid; gradual wavy boundary.

B21t—13 to 24 inches; yellowish red (5YR 5/8) silty clay; strong fine angular blocky structure; firm, sticky, plastic; few fine and medium roots; few pores; about 5 percent by volume fragments of shale; continuous medium clay films on faces of peds; extremely acid; gradual wavy boundary.

B22t—24 to 35 inches; yellowish red (5YR 5/8) silty clay; common fine and medium prominent yellowish brown (10YR 5/8) and red (2.5YR 4/8) mottles; strong fine angular blocky structure; firm, sticky, plastic; common fine and medium roots; few pores; about 5 percent by volume fragments of shale;

continuous medium clay films on faces of peds; extremely acid; gradual wavy boundary.

B3—35 to 41 inches; variegated red (2.5YR 4/8), yellowish brown (10YR 5/8), and gray (10YR 6/1) gravelly silty clay; strong fine angular blocky structure; firm, sticky, plastic; about 30 percent by volume flat fragments of shale; extremely acid; gradual wavy boundary.

Cr—41 to 46 inches; partly weathered shale with interstices filled with red (2.5YR 4/8) and gray (10YR 6/1) clay loam; extremely acid.

The thickness of the solum ranges from 32 to 59 inches. Depth to bedrock ranges from 40 to 60 inches. Reaction ranges from strongly acid to extremely acid throughout.

The A11 horizon is 1 to 3 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A12 horizon has hue of 10YR with value of 4 and chroma of 3 or 4 or value of 5 and chroma of 6; or it has hue of 7.5YR with value of 4 and chroma of 4 or value of 5 and chroma of 6 or 8. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture of the A horizon is fine sandy loam on the gravelly or stony analogs of that texture. The B1 horizon has hue of 7.5YR, value of 5, and chroma of 4, 6, or 8 or is absent in some pedons. The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. The lower part of the B2t horizon is mottled or variegated in shades of brown, red, or gray. Texture is silty clay or clay. The B3 horizon is mottled or variegated in shades of brown, red, and gray. Texture is silty clay or clay or the gravelly analogs of those textures. The Cr horizon is weathered shale grading to hard shale bedrock.

Gore series

The Gore series consists of deep, moderately well drained, very slowly permeable soils on escarpments and sides of shallow valleys. These nearly level soils formed in thick clayey alluvial deposits. The native vegetation was mixed hardwood forests.

Gore soils are geographically associated with Crowley and Jackport soils. Crowley soils, which are on broad flats, are somewhat poorly drained and do not have vertic properties. Jackport soils, which are on nearby lower elevations, are poorly drained.

Typical pedon of Gore silt loam, 1 to 3 percent slopes, in a soybean field NW1/4NW1/4NE1/4 of sec. 15, T. 5 N., R. 6 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; common fine dark concretions; strongly acid; abrupt smooth boundary.

A2—7 to 9 inches; pale brown (10YR 6/3) silt loam; common medium distinct strong brown (7.5YR 5/6) and few fine faint yellowish brown mottles; weak medium subangular blocky structure; friable; few fine roots; common pores; few dark concretions; strongly acid; clear wavy boundary.

B1—9 to 12 inches; reddish brown (5YR 5/4) silt loam; many fine and medium distinct red (2.5YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common pores; few clean patches of silt and sand coatings; few fine dark concretions; strongly acid; clear smooth boundary.

B21t—12 to 20 inches; red (2.5YR 4/6) silty clay; common medium distinct brownish yellow (10YR 6/6) and yellowish red (5YR 5/8) mottles and coatings on peds; moderate fine and medium subangular blocky structure; firm, plastic; few roots; few pores; many patchy thin clay films on faces of peds; few dark concretions; very strongly acid; gradual wavy boundary.

B22t—20 to 27 inches; mottled yellowish red (5YR 5/6), light brownish gray (10YR 6/2), and light yellowish brown (10YR 6/4) silty clay; moderate medium subangular blocky structure parting to fine angular blocky; firm, plastic; few roots; few pores; few dark concretions; continuous thin clay films on faces of peds; very strongly acid; gradual wavy boundary.

B23t—27 to 36 inches; mottled red (2.5YR 4/8) and light brownish gray (10YR 6/2) silty clay; common fine distinct gray mottles; moderate medium subangular blocky structure parting to weak fine angular blocky; firm; few fine roots; common patchy thin clay films on faces of peds; few thin silt coatings; very strongly acid; clear smooth boundary.

B3t—36 to 59 inches; gray (10YR 6/1) silty clay; many medium distinct yellowish brown (10YR 5/6) and common fine distinct strong brown mottles; weak medium columnar structure parting to weak fine angular blocky; firm; common patchy thin clay films on faces of peds; peds have shiny faces; few medium dark concretions; very strongly acid; clear smooth boundary.

C—59 to 72 inches; red (2.5YR 5/6) clay; few coarse prominent gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; common weblike black stains; peds have shiny faces; medium acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is strongly acid or medium acid in the A horizon and B1 horizon. Reaction of the Bt horizon is strongly acid or very strongly acid. Reaction of the C horizon is medium acid to mildly alkaline.

The Ap horizon ranges from 4 to 8 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3. Mottles, where present, are in shades of brown or gray. The B1 horizon has hue of 5YR, 7.5YR, or 10YR; value of 5; and chroma of 4. Mottles, where present, are in shades of brown, red, yellow, or gray. The

B2t horizon has hue of 5YR, value of 5, and chroma of 4 or 6; or it has hue of 2.5YR, value of 4 or 5, and chroma of 6; or it is mottled in shades of red, brown, yellow, or gray. Texture of the B2t horizon is silty clay or clay. The B3t horizon has colors and textures similar to those of the B2t horizon, or it may have dominant colors of gray.

Guthrie series

The Guthrie series consists of deep, poorly drained, slowly permeable soils on upland flats and in depressions below the foot slopes of rolling or steep ridges. These level soils formed in thick loamy sediments washed from loess or other silty materials weathered from siltstone, sandstone, and shale. The native vegetation was mixed hardwood forests. A fragipan is in the lower part of the subsoil. The water table is within 0.5 to 1 foot of the surface during the winter and spring. Slopes are 0 to 1 percent.

Guthrie soils are geographically associated with Barling, Leadvale, and Taft soils. Barling soils, which are nearer to streams than Guthrie soils, do not have a fragipan and are moderately well drained. Leadvale soils, which are on adjacent toe slopes of the uplands, have an argillic horizon above the fragipan and are moderately well drained. Taft soils, which are on a similar position on the landscape slightly higher in elevation, are somewhat poorly drained.

Typical pedon of Guthrie silt loam, 0 to 1 percent slopes, in a wooded area SW1/4NE1/4NW1/4 of sec. 4, T. 8 N., R. 7 W.

O1—1/2 inch to 0; partly decomposed organic material.

A1—0 to 2 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; many fine and medium roots; few worm holes; strongly acid; clear smooth boundary.

A2—2 to 7 inches; brown (10YR 5/3) silt loam; common fine and medium prominent yellowish red (5YR 4/6) root stains and few medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; many fine roots; few pores; strongly acid; clear wavy boundary.

B1g—7 to 11 inches; light gray (10YR 7/1) silt loam; common fine distinct dark yellowish brown mottles; weak medium subangular blocky structure; friable; common fine roots; common pores; common fine soft black accumulations; few concretions about one-fourth inch in diameter; very strongly acid; clear wavy boundary.

B2g—11 to 24 inches; light gray (10YR 7/1) silt loam; common medium and coarse distinct yellowish brown (10YR 5/8) and a few fine prominent yellowish red mottles; weak medium subangular blocky structure; friable; few fine roots; common pores; few black concretions up to one-half inch in diameter; few soft black accumulations; faint patchy clay films in pores and voids; very strongly acid; clear irregular boundary.

Bx1—24 to 40 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate thick platy; firm, compact and brittle; few fine roots concentrated between peds; common fine pores; common wedges and seams of light gray (10YR 7/1) silt loam; continuous thick clay films and thin discontinuous silt coatings on faces of prisms and bases of wedges; few tubular silt pockets; broken thin layers of weakly cemented concretionary material lining some silt pockets; very strongly acid; gradual wavy boundary.

Bx2—40 to 72 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate thick platy; hard, compact and brittle; few fine roots concentrated between prisms; few pores; few silt pockets 1 inch to 2 inches in diameter; thick continuous clay films on faces of prisms; very strongly acid.

The thickness of the solum is 72 inches or more. Depth to the fragipan is 20 to 36 inches. Reaction is very strongly acid or extremely acid throughout except where the surface layer has been limed.

The A horizon is 6 to 14 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B1g and B2g horizons have hue of 10YR, value of 6 or 7, and chroma of 1 or 2 with few to common mottles in shades of yellow and brown. The Bx horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 with few to common mottles in shades of yellow and brown. Texture of the B horizon is silt loam or silty clay loam.

Jackport series

The Jackport series consists of deep, poorly drained, very slowly permeable soils on terraces that are vestiges of backswamps of abandoned Mississippi River channels. These level and undulating soils formed in thick clayey alluvial material. The native vegetation was mixed hardwood forests, mainly water tolerant oaks. The water table is within 1 foot of the surface during the winter and spring. Slopes are 0 to 3 percent.

Jackport soils are geographically associated with Crowley and Gore soils. Crowley soils, which are at higher elevations than Jackport soils, have an abrupt textural change and do not have vertic properties. Gore soils, which are on intervening escarpments and slopes, are moderately well drained.

Typical pedon of Jackport silty clay loam, 0 to 1 percent slopes, in a soybean field SE1/4NE1/4NE1/4 of sec. 13, T. 6 N., R. 5 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine granular structure; firm, plastic; common fine roots; few fine concretions; slightly acid; abrupt wavy boundary.

A2g—7 to 13 inches; light brownish gray (10YR 6/2) silty clay loam; few medium distinct yellowish brown (10YR 5/8) and fine faint gray mottles; weak medium subangular blocky structure; firm, plastic; few fine roots; few pores; very strongly acid; gradual wavy boundary.

B21tg—13 to 19 inches; grayish brown (10YR 5/2) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm, plastic; few fine roots; few fine concretions; few slickensides; shiny faces on peds; very strongly acid; gradual smooth boundary.

B22tg—19 to 31 inches; grayish brown (10YR 5/2) clay; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm, very plastic; few fine roots; few fine concretions; few slickensides; shiny faces on peds; very strongly acid; gradual wavy boundary.

B3g—31 to 52 inches; grayish brown (10YR 5/2) silty clay; moderate medium angular blocky structure; firm, very plastic; few fine concretions; few slickensides; few fine white crystals; strongly acid; clear wavy boundary.

Cg—52 to 72 inches; grayish brown (2.5Y 5/2) silty clay; massive; firm, plastic; common black weblike stains; common patches of fine white crystals; few fine concretions; neutral.

The thickness of the solum ranges from 40 to about 60 inches. Reaction of the A horizon ranges from very strongly acid to medium acid except where surfaces have been limed or affected by irrigation water. Reaction of the B horizon is very strongly acid or strongly acid in the upper part but ranges to mildly alkaline in the lower part. The C horizon ranges from slightly acid to mildly alkaline.

The Ap horizon ranges from 4 to 8 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 2. The A2 horizon, if there is one, has hue of 10YR with value of 5 and chroma of 1 or value of 6 and chroma of 1 or 2. The A horizon ranges from 4 to.16 inches thick. The B2t horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2. Texture is clay or silty clay in the upper part and clay in the lower part. Mottles in shades of brown range from few to common. The B3 horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2. Texture is clay or silty clay. The C horizon has color and texture like those of the B3 horizon.

Kobel series

The Kobel series consists of deep, poorly drained, very slowly permeable soils on broad flats and in depressions that were backswamps on the White River flood plain. These level soils formed in thick clayey alluvial material. The native vegetation was mixed hardwood forests, mainly water-tolerant oaks. These soils are frequently flooded in the fall, winter, and spring. The water table is within 1 foot of the surface during the winter and spring. Slopes are 0 to 1 percent.

Kobel soils are geographically associated with Commerce and Robinsonville soils. Commerce soils, which are closer to streams on higher natural levees and alluvial plains than Kobel soils, have a fine-silty control section. Robinsonville soils, which are on natural levees adjacent to streams, do not have a B horizon and have a coarse-loamy control section.

Typical pedon of Kobel silty clay, frequently flooded, in a cultivated field NW1/4SW1/4NE1/4 of sec. 15, T. 9 N., R. 4 W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay; weak fine subangular blocky structure; firm, plastic; few fine roots; slightly acid; clear smooth boundary.

A12—5 to 9 inches; dark grayish brown (10YR 4/2) silty clay; weak medium subangular blocky structure; firm, plastic; few fine roots; slightly acid; clear smooth boundary.

B21g—9 to 16 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6), common medium faint dark grayish brown (10YR 4/2), and few medium distinct brown (10YR 4/3) mottles; moderate medium subangular blocky structure; firm, plastic; few fine roots; few fine dark concretions; slightly acid; clear smooth boundary.

B22g—16 to 45 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic; few fine roots; few fine dark concretions; slightly acid; gradual smooth boundary.

B3g—45 to 72 inches; dark gray (10YR 4/1) silty clay; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm, plastic; few fine roots; common black stains; slightly acid.

The thickness of the solum ranges from 30 to 72 inches. Reaction ranges from medium acid to neutral in the A horizon and from slightly acid to moderately alkaline in the B horizon.

The A horizon is 6 to 12 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. If the A horizon has value of 3 or less, it is less than 10 inches thick. The B horizon has hue of 10YR; value of 4, 5, or 6; and chroma of 1. Texture is clay or silty clay. There are common to many mottles in shades of brown and yellowish brown. The C horizon, if there is one, has colors similar to those of the B horizon. Texture is clay, silty clay, or silty clay loam.

Leadvale series

The Leadvale series consists of deep, moderately well drained, slowly or moderately slowly permeable soils on

toe slopes of rolling or steep ridges and on valley terraces on uplands. These nearly level to gently sloping soils formed in loamy alluvial material originally weathered mainly from siltstone and shale. A few areas may be influenced by loessal material. The native vegetation was mixed hardwood or mixed hardwood and pine forests. These soils have a fragipan at a depth of about 20 to 36 inches. A perched water table is within 2 to 3 feet of the surface during midwinter and early spring. Slopes range from 1 to 8 percent.

Leadvale soils are associated with Enders, Guthrie, Steprock, and Taft soils. Enders soils, which are on sides and foot slopes of adjacent ridges, have a clayey control section and do not have a fragipan. Guthrie and Taft soils, which are at lower elevations than Leadvale soils, do not have an argillic horizon above the fragipan. In addition, Guthrie soils are poorly drained, and Taft soils are somewhat poorly drained. Steprock soils, which are on sides of adjacent ridges and hills, do not have a fragipan and have a loamy-skeletal control section.

Typical pedon of Leadvale silt loam, 1 to 3 percent slopes, in a pasture SE1/4NW1/4NE1/4 of sec. 7, T. 7 N., R. 8 W.

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

B21t—5 to 15 inches; strong brown (7.5YR 5/6) silt loam, yellowish brown (10YR 5/6) crushed; moderate medium subangular blocky structure; friable; common fine roots; common pores; patchy thin clay films; few dark concretions and soft black accumulations; very strongly acid; clear smooth boundary.

B22t—15 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few roots; common pores; patchy distinct clay films in pores and on faces of some peds; few dark concretions and soft black accumulations; very strongly acid; clear wavy boundary.

Bx—24 to 47 inches; yellowish brown (10YR 5/6) silty clay loam; common fine and medium distinct light gray (10YR 7/2), strong brown (7.5YR 5/6), light yellowish brown (10YR 6/4), and pale brown (10YR 6/3) mottles; weak very coarse prismatic structure with horizontal cleavage planes parting to moderate medium subangular blocky; firm, compact and brittle; many pores lined with clay films; continuous distinct clay films on faces of some peds; few thin grayish silt coatings; very strongly acid; gradual wavy boundary.

B3t—47 to 72 inches; yellowish brown (10YR 5/8) silty clay loam fragments of Bx material; common medium distinct strong brown (7.5YR 5/6) mottles; light gray (10YR 7/1) silt loam coating Bx fragments; moderate medium subangular blocky structure; friable; many pores; thick gray (10YR 6/1) horizontal and vertical seams of silty clay; very strongly acid.

The thickness of the solum ranges from 40 to 72 inches or more. Depth to the fragipan ranges from 20 to 36 inches. Depth to shale bedrock is 4 feet or more. Reaction is strongly acid or very strongly acid throughout the solum.

The Ap horizon ranges from 5 to 7 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 3. The B21t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. The B22t horizon has hue of 10YR, value of 5, and chroma of 6 or 8. In some pedons faint brownish mottles are in the lower part of the B22t horizon, or the lower 2 or 3 inches of the horizon is mottled in shades of gray. Texture of the B2t horizon is silt loam or silty clay loam. The Bx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8 with mottles in shades of brown, gray, and yellow, or it has no dominant color and is mottled in shades of brown, gray, and yellow. Texture is silt loam or silty clay loam. The B3 horizon, if there is one, has colors and textures similar to those of the Bx horizon or is red or red and gray, mottled silty clay or clay.

Linker series

The Linker series consists of moderately deep, well drained, moderately permeable soils on hillsides, ridgetops, and benches. These gently sloping soils formed in loamy residual material weathered from sandstone or interbedded sandstone, siltstone, and shale. Slopes range from 3 to 8 percent.

Linker soils are associated with Allen, Enders, Mountainburg, Nauvoo, Sidon, and Steprock soils. The Allen soils, which are lower on the landscape than Linker soils, are more than 40 inches deep to bedrock. Enders soils, which are on nearby side slopes adjacent to benches and on a similar position on the landscape, are more than 40 inches deep to bedrock and have a clayey control section. Mountainburg soils, which are on the rims of ridgetops and benches, have a loamy-skeletal control section and are 20 inches or less deep to bedrock. Nauvoo soils, which are on a similar position on the landscape, are more than 40 inches deep to bedrock and are underlain by partly weathered sandstone. Sidon soils, which are on similar but commonly lower parts of the landscape, are more than 40 inches deep to bedrock and have a fragipan. Steprock soils, which are on a similar position on the landscape and are intermingled with Linker soils in some areas, have a loamy-skeletal control section.

Typical pedon of Linker fine sandy loam, 3 to 8 percent slopes, in an old field of pine trees SE1/4SE1/4SE1/4 of sec. 13, T. 8 N., R. 9 W.

Ap—0 to 6 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; many fine roots; thin layer of dark grayish brown one-fourth inch thick along surface; about 5 percent gravel up to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

B2t—6 to 21 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; patchy thin clay films; about 10 percent gravel up to 1 inch in diameter; very strongly acid; clear wavy boundary.
B3—21 to 32 inches; yellowish red (5YR 5/6) gravelly fine sandy loam; common medium distinct strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), pale brown (10YR 6/3), and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; about 20 percent gravel up to 1 inch in diameter; very strongly acid; gradual smooth boundary.
Cr—32 to 38 inches; strong brown (7.5YR 5/6) and yellowish brown (10YR 5/8) weathered sandstone and loamy sand.
R—38 to 40 inches; sandstone bedrock.

The thickness of the solum and depth to bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to extremely acid throughout.

The Ap horizon has hue of 10YR with value of 4 and chroma of 3 or 4 or value of 5 and chroma of 3. In some pedons the A1 horizon is 2 to 3 inches thick and has hue of 10YR, value of 3 or 4, and chroma of 2 or 4. Some pedons have an A2 horizon that has hue of 10YR, value of 5, and chroma of 2, 3, or 4. Texture is fine sandy loam and gravelly fine sandy loam. The B1 horizon, if there is one, has hue of 7.5YR, value of 4 or 5, and chroma of 6 or has hue of 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is fine sandy loam or loam. The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam, clay loam, or loam. Coarse fragments, by volume, range from 0 to 10 percent in the B1 and B2t horizons. The B3 horizon has colors similar to those of the B2t horizon and is mottled in shades of red, brown, and gray. Coarse fragments range from 0 to 25 percent by volume. The Cr horizon is 1 to 6 inches thick and is reddish, brownish, or grayish weathered sandstone.

Loring series

The Loring series consists of deep, moderately well drained, moderately slowly permeable soils on low escarpments and the higher parts of terraces. These nearly level or gently sloping soils formed in thick loamy loessial material. The native vegetation was mixed hardwood forests. These soils have a fragipan in the lower part of the solum. A perched water table is within 2 or 3 feet of the surface during the winter and early spring. Slopes range from 1 to 8 percent.

Loring soils are geographically associated with Calhoun and Calloway soils. Both Calhoun and Calloway soils are at lower elevations. Calhoun soils do not have a fragipan and are poorly drained. Calloway soils do not have an argillic horizon above the fragipan and are somewhat poorly drained.

Typical pedon of Loring silt loam, 1 to 3 percent slopes, SE1/4SE1/4SW1/4 of sec. 14, T. 5 N., R. 8 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; few fine dark concretions; medium acid; clear smooth boundary.
B1—7 to 14 inches; strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; common fine pores; few fine dark concretions; patchy thin clay films; very strongly acid; clear smooth boundary.
B2t—14 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; few fine pores; common fine dark concretions; continuous thin clay films; very strongly acid; clear wavy boundary.
Bx1—26 to 32 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to moderate very thick platy; firm, compact and brittle; prisms are about 6 inches wide and are separated by light brownish gray (10YR 6/2) silty clay loam wedges; plates are separated at about 2-inch intervals and are coated with gray silt; few roots along faces of prisms; common fine pores lined with clay films; broken distinct clay films along faces of prisms; very strongly acid; clear wavy boundary.
Bx2—32 to 39 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate thick platy; firm, compact and brittle; about 60 percent of the cross section is firm and brittle material; fills in cracks of gray silty clay loam separate prisms at mean intervals of 4 inches or more; few fine roots between faces of prisms and between some plates; few fine pores; continuous thick clay films on faces of prisms and between plates; very strongly acid; clear wavy boundary.
Bx3—39 to 72 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct gray (10YR 6/1) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; few fills in cracks and tubular pockets of gray silty clay loam encased in yellowish red soft concretionary material; very strongly acid.

The thickness of the solum ranges from 50 to 72 inches or more. Depth to the fragipan ranges from 24 to 35 inches. Reaction is medium acid or strongly acid in the A horizon. Reaction of the B horizon is strongly acid or very strongly acid.

The A horizon ranges from 6 to 8 inches thick. It has hue of 10YR with value of 4 and chroma of 3 or value of

5 and chroma of 4. The B1 and B2t horizons have hue of 7.5YR, value of 5, and chroma of 6 or hue of 10YR, value of 5, and chroma of 4 or 6. Texture is silt loam or silty clay loam. Some pedons do not have a B1 horizon. The Bx horizon has colors and textures similar to those of the B2t horizon. It is mottled in shades of brown and gray or is equally mottled in shades of brown, yellow, and gray.

Mountainburg series

The Mountainburg series consists of shallow, well drained, moderately rapidly permeable soils on the rims of ridgetops and benches. These gently sloping or moderately sloping soils formed in loamy residual material weathered from sandstone. The native vegetation was poor quality mixed hardwood and pine forests that had an understory of forbs and native grasses. Hard sandstone bedrock is at a depth of less than 20 inches. Slopes range from 3 to 12 percent.

Mountainburg soils are geographically associated with Enders, Linker, Sidon, and Steprock soils. Enders soils, which are generally on the lower side slopes of ridges, are more than 20 inches deep to bedrock and have a clayey control section. Linker soils, which are more distant from the rims of ridgetops and benches, have a fine-loamy control section and are 20 inches or more deep to bedrock. Sidon soils, which are on ridgetops and broad benches, have a fragipan and are more than 20 inches deep to bedrock. Steprock soils, which are on the lower side slopes and are intermingled with Mountainburg soils in some areas, are more than 20 inches deep to bedrock.

Typical pedon of Mountainburg stony fine sandy loam, 3 to 12 percent slopes, in a sparse wooded and grassy area NE1/4SW1/4NW1/4 of sec. 4, T. 7 N., R. 7 W.

A1—0 to 1 inch; brown (10YR 4/3) stony fine sandy loam; weak fine granular structure; very friable; many fine roots; about 15 percent by volume sandstone fragments less than 3 inches in diameter, 15 percent by volume flagstones 3 to 10 inches in diameter, stones up to 30 inches in diameter at intervals of 25 to 100 feet are exposed on the surface; very strongly acid; clear smooth boundary.

A2—1 to 8 inches; dark yellowish brown (10YR 4/4) stony fine sandy loam; weak fine subangular blocky structure; very friable; many fine roots; about 15 percent by volume sandstone gravel smaller than 3 inches in diameter and 15 percent by volume flat fragments and flagstone 3 to 30 inches in diameter; very strongly acid; gradual smooth boundary.

B2t—8 to 18 inches; yellowish red (5YR 5/6) very gravelly sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common pores; few patchy clay films on faces of peds and lining pores; about 50 percent by volume gravel smaller than 3 inches in diameter and about 10 percent by volume flat fragments and flagstones 3 to 10 inches in diameter; very strongly acid; abrupt smooth boundary.

R—18 to 20 inches; hard sandstone bedrock.

The thickness of the solum and depth to bedrock range from 12 to 20 inches. Reaction ranges from medium acid to very strongly acid in the A horizon and is strongly acid or very strongly acid in the B horizon.

The A1 horizon is 1 to 3 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon is 2 to 4 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 3. The A horizon is 4 to 10 inches thick. Texture is gravelly fine sandy loam or stony fine sandy loam. The A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is gravelly fine sandy loam or stony fine sandy loam. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or hue of 5YR, value of 4 or 5, and chroma of 6. Texture is very gravelly fine sandy loam, very gravelly sandy clay loam, or very gravelly loam.

Nauvoo series

The Nauvoo series consists of deep, well drained, moderately permeable soils on hillsides and ridgetops. These gently sloping soils formed in loamy residual material weathered from sandstone or interbedded sandstone, siltstone, and shale. The native vegetation was mixed hardwood and pine forests. Slopes range from 3 to 8 percent.

Nauvoo soils are geographically associated with Linker, Sidon, and Steprock soils. Linker soils, which are on a similar position on the landscape, are 40 inches or less deep to hard sandstone bedrock. Sidon soils are on a similar position on the landscape but lower in elevation, and they have a fragipan. Steprock soils, which are lower on sides of ridges and hills, have a loamy-skeletal control section.

Typical pedon of Nauvoo fine sandy loam, 3 to 8 percent slopes, in a soybean field SE1/4SE1/4NW1/4 of sec. 9, T. 7 N., R. 10 W.

Ap—0 to 6 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; about 3 percent sandstone gravel up to 1 1/2 inches in diameter; strongly acid; abrupt smooth boundary.

B1—6 to 13 inches; strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable; common fine roots; few pores; about 3 percent gravel up to 1 1/2 inches in diameter; strongly acid; clear wavy boundary.

B21t—13 to 25 inches; yellowish red (5YR 4/8) loam; moderate medium subangular blocky structure; friable; few fine and medium roots; few pores; about 5 percent gravel up to 1 inch in diameter; patchy distinct clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—25 to 32 inches; yellowish red (5YR 5/6) loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few pores; about 5 percent gravel; patchy distinct clay films on faces of peds; strongly acid; clear wavy boundary.
B3—32 to 41 inches; yellowish red (5YR 4/8) fine sandy loam; few medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few roots; few pores; few soft weathered sandstone fragments of loamy sand texture; strongly acid; gradual wavy boundary.
C—41 to 50 inches; strong brown (7.5YR 5/8) fine sandy loam; many medium distinct yellowish red (5YR 4/8) mottles; original rock structure laminated in 1/2- to 2-inch layers; compact, firm; layers are coated with clean sand grains; strongly acid; gradual wavy boundary.
Cr—50 to 72 inches; yellowish brown rippable sandstone laminated in 1/2- to 3-inch layers; white sand coatings along cleavage planes; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches, and depth to weathered bedrock ranges from 40 to 60 inches. Depth to hard sandstone is 48 inches or more. Reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3, 4, or 6. It is 4 to 8 inches thick. Coarse fragments range from 0 to 5 percent by volume. The B1 horizon, if there is one, has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is fine sandy loam, loam, or sandy clay loam. The B2t horizon has hue of 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is loam, clay loam, or sandy clay loam. In some pedons the lower part of the B2t horizon is mottled in shades of yellow or brown. Coarse fragments range from 0 to 5 percent. The B3 horizon has colors like those of the B1 horizon or is mottled in shades of yellow or brown. Texture is fine sandy loam or loam. Coarse fragments range from 0 to 10 percent. The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8. It has few to many mottles and streaks in shades of red. Texture is fine sandy loam or loamy sand. The C horizon is absent in some pedons. The Cr horizon is level bedded, partly weathered sandstone or interbedded sandstone, siltstone, and shale. Colors are in shades of red, yellow, and gray.

Nugent series

The Nugent series consists of deep, excessively drained, moderately rapidly permeable soils on natural levees in restricted stream valleys and below breaks in natural levees mainly along the Little Red River. These level soils formed in thick sandy alluvial material. The native vegetation was mixed hardwood forests. These soils are occasionally flooded during the winter and spring. Slopes are less than 1 percent.

Nugent soils are geographically associated with Rexor and Spadra soils. Rexor soils, which are on higher lying natural levees and flood plains more distant from stream channels than Nugent soils, have a fine-silty control section and an argillic horizon. Spadra soils, which are on higher lying natural levees and terraces, have a fine-loamy control section and an argillic horizon.

Typical pedon of Nugent loamy fine sand, occasionally flooded, in a field NE1/4SW1/4NE1/4 of sec. 2, T. 7 N., R. 6 W.

Ap—0 to 8 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; common roots; slightly acid; clear smooth boundary.
C1—8 to 14 inches; brown (7.5YR 4/4) fine sandy loam; few fine distinct pale brown mottles; weak medium subangular blocky structure; very friable; few roots; medium acid; gradual smooth boundary.
C2—14 to 29 inches; brown (7.5YR 5/4) loamy sand, thin strata of yellowish brown (10YR 5/4) sand; structureless; very friable; few roots; slightly acid; gradual smooth boundary.
C3—29 to 72 inches; yellowish brown (10YR 5/6) loamy sand; structureless; very friable; few fine roots; slightly acid.

Reaction is medium acid or slightly acid throughout.

The A horizon ranges from 6 to 8 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 3. The C horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 or hue of 10YR with value of 5 and chroma of 3 to 6 or value of 6 and chroma of 3 or 4. Texture is dominantly loamy sand with thin lenses of sand, fine sandy loam, loam, or silt loam.

Oaklimeter series

The Oaklimeter series consists of deep, moderately well drained, moderately permeable soils on natural levees of streams flowing through loess terraces. These level soils formed in thick loamy alluvial sediments washed mainly from adjacent loessial soils. The native vegetation was mixed hardwood forests. These soils are frequently flooded during the winter and spring. The water table is within 1.5 to 2.5 feet of the surface during the same period. Slopes are 0 to 1 percent.

Oaklimeter soils are geographically associated with Tichnor soils. Tichnor soils, which are on backswamps farther from streams than Oaklimeter soils, have a thick A2 horizon and a fine-silty control section.

Typical pedon of Oaklimeter silt loam, frequently flooded, in a wooded area SW1/4NE1/4SE1/4 of sec. 11, T. 5 N., R. 8 W.

O1—1/2 inch to 0; partly decomposed plant material.
A1—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; clear smooth boundary.

B21—6 to 12 inches; brown (10YR 4/3) silt loam; few medium distinct yellowish brown (10YR 5/4) and pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; many fine and medium roots; very strongly acid; clear wavy boundary.

B22—12 to 22 inches; yellowish brown (10YR 5/4) silt loam; many fine and medium distinct brown (10YR 4/3) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few fine pores; few fine dark brown accumulations; very strongly acid; gradual wavy boundary.

B23—22 to 33 inches; yellowish brown (10YR 5/4) silt loam; many fine distinct brown and pale brown and few fine distinct gray mottles; moderate medium subangular blocky structure; friable; few fine and medium roots, common fine pores; few fine dark brown accumulations; very strongly acid; gradual wavy boundary.

B2tbg—33 to 72 inches; gray (10YR 6/1) silt loam; common medium distinct dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/6), and light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly brittle; few roots; many fine pores; common fine and medium concretions and soft accumulations; few seams of silty clay; clay films in pores; very strongly acid.

The thickness of the solum is 72 inches or more. Reaction is strongly acid or very strongly acid throughout.

The A1 horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is 4 to 6 inches thick. The A12 horizon, if there is one, has hue of 10YR with value of 4 and chroma of 3 or 4 or value of 5 and chroma of 3. The Ap horizon has colors similar to those of the A12 horizon. The A horizon is 6 to 10 inches thick. The B21 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4 or hue of 7.5YR, value of 4, and chroma of 4. It has none to common mottles in shades of brown or gray. The B22 horizon has hue of 10YR, value of 4 or 5, and chroma of 4. It has few to common mottles in shades of brown or gray. The B23 horizon has colors similar to those of the B22 horizon or has hue of 10YR, value of 6, and chroma of 1 or 2. It is absent in some pedons. The B2tbg horizon has hue of 10YR, value of 6, and chroma of 1 or 2. It has few to common mottles in shades of yellow and brown. Texture of the B2tbg horizon is silt loam or silty clay loam.

Rexor series

The Rexor series consists of deep, well drained, moderately permeable soils on natural levees mainly along Little Red River. These level soils formed in thick loamy alluvial material. The native vegetation was mixed hardwood forests. The soils are occasionally flooded during the winter and spring. Slopes are 0 to 1 percent.

Rexor soils are geographically associated with Nugent and Spadra soils. Nugent soils, which are on lower natural levees and closer to stream channels than Rexor soils, have a sandy control section and do not have an argillic horizon. Spadra soils, which are on a similar position on the landscape and on nearby lower terraces, have a fine-loamy control section.

Typical pedon of Rexor silt loam, occasionally flooded, in a moist pasture NW1/4NE1/4NE1/4 of sec. 10, T. 9 N., R. 7 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

B21t—7 to 30 inches; brown (7.5YR 4/4) silty clay loam; few fine faint yellowish brown mottles; moderate medium subangular blocky structure; firm; few roots; few pores; patchy thin clay films on faces of peds; few weblike black stains; medium acid; gradual smooth boundary.

B22t—30 to 46 inches; brown (7.5YR 4/4) silty clay loam; few fine distinct grayish brown and yellowish brown mottles; moderate medium subangular blocky structure; firm; few roots; few pores; patchy thin clay films on faces of peds; common black stains on faces of peds; medium acid; gradual smooth boundary.

B3t—46 to 72 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/4) and few fine distinct grayish brown mottles; weak medium subangular blocky structure; friable; few pores and voids; patchy thin clay films on faces of peds; medium acid.

The thickness of the solum ranges from 40 to 72 inches or more. Reaction ranges from medium acid to very strongly acid throughout except where the surface layer has been limed.

The Ap horizon is 7 to 10 inches thick. It has hue of 10YR with value of 4 and chroma of 2 or 3 or value of 3 and chroma of 2. Horizons that have value of 3 and chroma of 2 are less than 6 inches thick. The B2t horizon has hue of 7.5YR or 10YR with value of 4 and chroma of 4 or value of 5 and chroma of 4, 6, or 8. Some pedons have few to common mottles in shades of gray and brown below a depth of 30 inches. Texture is silt loam or silty clay loam. The B3 horizon, if there is one, has colors similar to those of the B2t horizon. Texture is silt loam or loam.

Robinsonville series

The Robinsonville series consists of deep, well drained, moderately permeable to moderately rapidly permeable soils on natural levees along the White River. These level soils formed in thick stratified loamy and

sandy alluvial material. The native vegetation was mixed hardwood forests including pecan. These soils are frequently flooded during the winter and spring. Slopes are 0 to 1 percent.

Robinsonville soils are geographically associated with Commerce and Kobel soils. Commerce soils, which are on nearby alluvial plains and natural levees, have a cambic B horizon and a fine-silty control section. Kobel soils, which are in backswamp slack water areas farther from the streams than Robinsonville soils, have a B horizon and a fine control section.

Typical pedon of Robinsonville fine sandy loam, frequently flooded, in a moist cultivated field SW1/4NW1/4NE1/4 of sec. 28, T. 6 N., R. 4 W.

Ap—0 to 6 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

C1—6 to 14 inches; brown (10YR 4/3) stratified fine sandy loam and loamy fine sand; common medium distinct yellowish brown (10YR 5/4) and few medium faint brown (10YR 5/3) mottles; massive; friable; few fine and medium roots; few distinct bedding planes; few very dark grayish brown stains of decaying organic matter; slightly acid; abrupt wavy boundary.

C2—14 to 21 inches; yellowish brown (10YR 5/4) loamy fine sand; massive, single grain; few fine and medium roots; few thin lenses of brown (10YR 4/3) and dark brown (10YR 3/3); slightly acid; clear smooth boundary.

C3—21 to 30 inches; brown (10YR 4/3) fine sandy loam; common fine faint dark yellowish brown, common medium distinct grayish brown (10YR 5/2), and few fine distinct gray mottles; massive; friable; few fine and medium roots; distinct bedding planes; slightly acid; clear smooth boundary.

C4—30 to 72 inches; brown (10YR 4/3) silt loam; common fine faint mottles and coatings of dark yellowish brown (10YR 4/4), dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), and very dark grayish brown (10YR 3/2); weak medium angular blocky structure with indistinct broken bedding planes; friable; few wormholes and castings; few old root channels; slightly acid.

Reaction ranges from slightly acid to neutral throughout.

The A horizon ranges from 4 to 8 inches thick. It has hue of 10YR, value of 4, and chroma of 2, 3, or 4. The C horizon has hue of 10YR; value of 4, 5, or 6; and chroma of 3 or 4. The C horizon is stratified silt loam, loam, very fine sandy loam, fine sandy loam, loamy very fine sand, or loamy fine sand. Some pedons have mottles in chroma of 2 or less below a depth of 20 inches.

Sidon series

The Sidon series consists of deep, moderately well drained, slowly permeable soils on undulating ridgetops and broad benches. These nearly level and gently sloping soils formed in residual material weathered from interbedded sandstone, shale, and siltstone. The native vegetation was mixed hardwood and pine forests. These soils have a fragipan in the middle part of the solum. The water table is within 2 or 3 feet of the surface during late winter and early spring. Slopes range from 1 to 8 percent.

Sidon soils are associated with Allen, Enders, Linker, Mountainburg, and Nauvoo soils. Allen soils, which are on higher parts of the landscape than Sidon soils, do not have a fragipan. Enders soils, which are on the lower side slopes of ridges, have a clayey control section and do not have a fragipan. Linker soils, which are on similar but commonly higher parts of the landscape, are moderately deep and do not have a fragipan. Mountainburg soils, which are on rims of the higher ridgetops, are 20 inches or less deep to bedrock and do not have a fragipan. Nauvoo soils, which are on a similar position on the landscape but at higher elevations, do not have a fragipan.

Typical pedon of Sidon loam, 1 to 3 percent slopes, in a pasture NW1/4NE1/4NE1/4 of sec. 12, T. 10 N., R. 6 W.

Ap—0 to 6 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; many fine roots; few fine pores; few fine dark concretions; strongly acid; abrupt smooth boundary.

B21t—6 to 13 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; many fine roots; common fine pores; few thin patchy clay films on faces of peds and in pores; few fine dark concretions; very strongly acid; clear smooth boundary.

B22t—13 to 25 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; few thin patchy clay films on faces of peds and in pores; extremely acid; gradual wavy boundary.

Bx—25 to 41 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish red (5YR 4/6), light brownish gray (10YR 6/2), and gray (10YR 6/1) mottles; weak very coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; few fine roots between prisms; few fine pores; continuous distinct clay films on faces of peds and in pores; streaks and patches of clean silt and sand grains between prisms and some peds; prisms have a mean width of more than 4 inches; about 70 percent of material is brittle; extremely acid; gradual smooth boundary.

B3t—41 to 53 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct red (2.5YR 5/6) and

gray (10YR 6/1) mottles and streaks; moderate very coarse platy structure parting to weak medium angular blocky; firm, slightly brittle; many horizontal and common vertical streaks of continuous distinct clay films; patchy clean sand grains; about 15 percent subrounded sandstone fragments 1/2 inch to 3 inches in diameter; extremely acid; clear wavy boundary.

R—53 to 55 inches; horizontal bedded hard sandstone.

The thickness of the solum and depth to hard sandstone bedrock range from 40 to more than 72 inches. Some pedons have a thin Cr horizon. Depth to the fragipan ranges from 24 to 36 inches. Reaction ranges from strongly acid to extremely acid throughout.

The Ap horizon is 4 to 7 inches thick. It has hue of 10YR, value of 4, and chroma of 3 or 4. Weathered sandstone fragments less than 3 inches in diameter range from 0 to 2 percent by volume. The B21t horizon has hue of 7.5YR or 10YR; value of 5, and chroma of 6 or 8. In some pedons yellowish red (5YR 5/6, 5/8) coatings are on faces of peds. Texture is silt loam, silty clay loam, clay loam, or loam. Weathered sandstone fragments less than 3 inches in diameter range from 0 to 2 percent by volume. The B22t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. It has none to common mottles in shades of gray below depths of 16 inches. Texture is silt loam, silty clay loam, clay loam, or loam. Weathered sandstone fragments less than 3 inches in diameter range from 0 to 2 percent by volume. The Bx horizon has matrix colors in hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8; mottles in hue of 10YR, value of 6 or 7, and chroma of 1 or 2; and hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6; or is equally mottled in shades of the foregoing colors. Texture is loam, clay loam, or has gravelly textural modifiers. It has 0 to 35 percent by volume coarse fragments. The B3t horizon has colors similar to those of the Bx horizon. Texture is sandy loam, loam, sandy clay loam, clay loam, or gravelly, or very gravelly analogs of those textures. The B3t horizon has 0 to 45 percent by volume coarse fragments. In some pedons this horizon is lacking.

In some pedons the C horizon is about 1 to 6 inches thick. Texture is sandy loam, loamy sand, or has gravelly or very gravelly textural modifiers. The Cr horizon, if there is one, is about 1 to 4 inches thick and is reddish, brownish, or grayish weathered sandstone. The R horizon is hard level-bedded acid sandstone with few cracks that have horizontal spacing of 6 inches or more.

Spadra series

The Spadra series consists of deep, well drained, moderately permeable soils on older natural levees and low terraces of streams flowing through the uplands. These level soils formed in thick loamy alluvial material originally weathered from sandstone, siltstone, and shale. The native vegetation was mixed hardwood forests. These soils are occasionally flooded during the winter and spring. Slopes are 0 to 1 percent.

Spadra soils are geographically associated with Barling, Nugent, and Rexor soils. Barling soils, which are farther downstream or on slightly lower flood plains than Spadra soils, have a coarse-silty control section and a cambic horizon. Nugent soils, which are on lower natural levees, have a sandy control section and do not have an argillic horizon. Rexor soils, which are on a similar position on the landscape, have a fine-silty control section.

Typical pedon of Spadra fine sandy loam, occasionally flooded, in a soybean field SE1/4SE1/4NE1/4 of sec 27, T. 9 N. R. 8 W.

Ap—0 to 7 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

A12—7 to 10 inches; brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; medium acid; clear smooth boundary.

B2t—10 to 41 inches; brown (7.5YR 4/4) loam; few medium faint strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; common pores; thin patchy clay films; medium acid; gradual smooth boundary.

C1—41 to 72 inches; brown (7.5YR 4/4) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; strongly acid; gradual smooth boundary.

The thickness of the solum ranges from 40 to 60 inches, and depth to bedrock is more than 72 inches. Reaction ranges from medium acid to very strongly acid throughout.

The A horizon is 6 to 10 inches thick. It has hue of 7.5YR or 10YR, value of 4, and chroma of 4 or it has hue of 10YR, value of 4, and chroma of 3. The B2t horizon has hue of 7.5YR, value of 4, and chroma of 4 or hue of 5YR, value of 4 or 5, and chroma of 4 or 6. Texture is loam or sandy clay loam. The B3 horizon, if there is one, has hue of 7.5YR, value of 4, and chroma of 4 or 6 or hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is loam, sandy loam, fine sandy loam, or the gravelly analogs of those textures. The C horizon has colors and textures similar to those of the B3 horizon.

Steprock series

The Steprock series consists of moderately deep, well drained, moderately permeable soils on hillsides and ridges. These gently sloping to steep soils formed in loamy residual and colluvial material weathered from interbedded sandstone, siltstone, and shale. The native

vegetation was mixed hardwood and pine forests. Slopes range from 3 to 30 percent.

Steprock soils are geographically associated with Enders, Leadvale, Linker, Mountainburg, and Nauvoo soils. Enders soils, which are generally downslope and intermingled in some areas, have a clayey control section. Leadville soils, which are on toe slopes and terraces at the lower elevations, have a fragipan and a fine-silty control section. Linker soils, which are on a similar position on the landscape and are intermingled with Steprock soils in some areas, have a fine-loamy control section. Mountainburg soils, which are near ridgetops and benches and are intermingled with Steprock soils in some areas, are 20 inches or less deep to bedrock. Nauvoo soils, which are near hilltops and are generally upslope from Steprock soils, have a fine-loamy control section.

Typical pedon of Steprock very flaggy loam, from a wooded area of Steprock-Enders complex, 12 to 30 percent slopes, NE1/4SE1/4SW1/4 of sec. 29, T. 7 N., R. 9 W.

O1—1 inch to 0; partly decomposed organic matter.

A1—0 to 1 inch; dark grayish brown (10YR 4/2) very flaggy loam; weak fine granular structure; very friable; few fine roots; about 20 percent by volume gravel 1/4 inch to 3 inches in diameter and 20 percent by volume flat fragments and flagstones 3 to 10 inches in diameter; strongly acid; abrupt smooth boundary.

A21—1 inch to 3 inches; brown (10YR 5/3) very flaggy loam; weak fine subangular blocky structure; friable; few fine roots; few fine pores; about 20 percent by volume gravel 1/4 inch to 3 inches in diameter and 20 percent by volume flat fragments and flagstones 3 to 10 inches in diameter; strongly acid; clear smooth boundary.

A22—3 to 9 inches; yellowish brown (10YR 5/8) very flaggy fine sandy loam; weak medium subangular blocky structure; friable; many fine and medium roots; common fine pores; about 20 percent by volume gravel 1/4 inch to 3 inches in diameter and 20 percent by volume flat fragments and flagstones 3 to 10 inches in diameter; strongly acid; clear smooth boundary.

B1—9 to 16 inches; strong brown (7.5YR 5/8) very gravelly loam; weak fine and medium subangular blocky structure; friable; many fine and medium roots; common medium pores; few thin patchy clay films; about 20 percent by volume gravel 1/4 inch to 3 inches in diameter and about 15 percent by volume flat fragments and flagstones 3 to 10 inches in diameter; very strongly acid; clear wavy boundary.

B21t—16 to 24 inches; yellowish red (5YR 5/8) very gravelly loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; few medium pores; many thin patchy clay films on faces of peds and in pores; about 35 percent by volume gravel 1/4 inch to 3 inches in diameter and about 20 percent by volume flat fragments and flagstones 3 to 15 inches in diameter; very strongly acid; gradual wavy boundary.

B22t—24 to 28 inches; yellowish red (5YR 5/8) very gravelly loam; weak fine subangular blocky structure; very friable; few fine roots; few thin vertical streaks of material coated with thin clay films; about 75 percent by volume weathered fragments of flagstones 1/4 inch to 10 inches in diameter; very strongly acid; clear irregular boundary.

Cr—28 to 48 inches; yellowish red (5YR 5/8) sand filling thin vertical interstices in partly weathered sandstone; few fine roots in interstices; sandstone hardness ranges between 2 and 3 on the Mohs scale.

The thickness of the solum and depth to the Cr horizon range from 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3, 4, 6, or 8. An Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. Texture of the A horizon is gravelly fine sandy loam, very flaggy fine sandy loam, very flaggy loam, or stony fine sandy loam. The A horizon ranges from 6 to 17 inches thick. The B1 horizon, if there is one, has hue of 7.5YR or 5YR, value of 5, and chroma of 6 or 8. Texture is sandy loam, fine sandy loam, or loam or the gravelly or very gravelly analogs of those textures. Sandstone, siltstone, or shale fragments less than 3 inches in diameter range from 15 to 35 percent, and larger fragments range from 0 to 30 percent. The B2 horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Mottles, if present, are few and in shades of brown. Texture is sandy clay loam, clay loam, or loam or the very gravelly analogs of those textures. Sandstone, siltstone, or shale less than 3 inches in diameter range from 30 to 50 percent of the volume and larger fragments range from 5 to 30 percent. The B3 horizon, if there is one, has colors similar to those of the B2 horizon. Texture is sandy loam, fine sandy loam, loamy fine sand, loamy sand, and silt loam or the very gravelly analogs of those textures. The percent of coarse fragments is similar to that of the B2 horizon.

In some pedons the C horizon is about 1 to 6 inches thick. Texture is sandy loam, fine sandy loam, loamy fine sand, loamy sand, sand, or silt loam or the very gravelly analog of those textures. The percent of coarse fragments is similar to that of the B2 horizon. Colors are similar to those of the B horizon. The Cr horizon is partly weathered sandstone or siltstone with horizontal cleavage planes less than 3 inches apart, partly weathered shale, or interbedded layers of these materials. Hardness of the material ranges from 1.5 to 3 on the Mohs scale.

Taft series

The Taft series consists of deep, somewhat poorly drained, slowly permeable soils on upland valley terraces, on upland flats, and in depressions. These level or nearly level soils formed in thick loamy sediments washed from material weathered from siltstone, shale, sandstone, and loess. The native vegetation was mixed hardwood forests. These soils have a fragipan in the lower part of the subsoil. A perched water table is within 1 foot to 2 feet of the surface during midwinter and early spring. Slopes are less than 2 percent.

Taft soils are geographically associated with Guthrie and Leadvale soils. Guthrie soils, which are at slightly lower elevations than Taft soils, are poorly drained. Leadvale soils, which are at higher elevations, have an argillic horizon above the fragipan and are moderately well drained.

Typical pedon of Taft silt loam, 0 to 2 percent slopes, in a pasture SW1/4SW1/4SW1/4 of sec. 26, T. 8 N., R 8 W.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak medium granular structure; friable; many fine roots; few pores and worm-holes; medium acid; clear smooth boundary.

B21—6 to 11 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct strong brown (7.5YR 5/6) and few medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; common fine roots; common pores; few dark brown concretions; very strongly acid; clear smooth boundary.

B22—11 to 20 inches; pale brown (10YR 6/3) silt loam; common medium prominent strong brown (7.5YR 5/6) and faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few roots; common pores; few dark brown concretions; very strongly acid; clear wavy boundary.

A'2&B'x1—20 to 22 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles and few strong (7.5YR 5/8) fragments of brittle material; weak medium subangular blocky structure; friable; few roots; common pores; very strongly acid; clear irregular boundary.

Bx2—22 to 32 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate very coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; few roots between prisms; prominent seams of gray silty clay separate polygons; continuous distinct clay films on faces of some peds and pores; wedges of A'2 material comprise about 20 percent by volume of horizon; very strongly acid; clear smooth boundary.

Bx3—32 to 48 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct gray (10YR 6/1) and few fine prominent red (2.5YR 4/6) mottles; moderate very coarse prismatic structure parting to moderate medium angular blocky; firm, compact and brittle; few roots between prisms; continuous distinct clay films on some ped faces and in pores; few seams of gray silty clay; few gray thin silt coatings on peds; very strongly acid; gradual smooth boundary.

Bx4—48 to 72 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, compact and brittle; continuous distinct clay films on faces of peds and in pores; thick seams of gray silty clay; about 5 percent hard subrounded shale and sandstone fragments 1/4 inch to 1 1/2 inches in diameter; common dark concretions; very strongly acid.

The thickness of the solum ranges from 60 to 72 inches or more. Depth to the fragipan ranges from 20 to 30 inches. Reaction ranges from strongly acid to extremely acid throughout the solum except where the surface layer has been limed.

The A horizon has hue of 10YR with value of 4 and chroma of 2 or value of 5 and chroma of 3 or 4. It is 5 to 9 inches thick. The B2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. This horizon has mottles with chroma of 2 or less within 10 inches of its upper boundary and within 16 inches of the soil surface. Texture is silt loam or silty clay loam. The Bx horizon has matrix colors in hue of 10YR, value of 5, and chroma of 4, 6, or 8 or is equally mottled in shades of gray, yellow, and brown. Texture is silt loam or silty clay loam.

Tichnor series

The Tichnor series consists of deep, poorly drained, slowly permeable soils on backswamps of flood plains of small streams. These level soils formed in thick loamy alluvial material washed mainly from adjoining loessial soils. The native vegetation was mixed hardwood forests, mainly water-tolerant oaks. These soils are frequently flooded during the winter and spring. The water table is within 1 foot of the surface during the same period. Slopes are less than 1 percent.

Tichnor soils are geographically associated with Oaklimeter and Bonn soils. Oaklimeter soils, which are on natural levees, closer to streams than Tichnor soils, do not have an A2 horizon and have a coarse silty control section. Bonn soils, which are on low terraces normally above the flood plain, have a natric horizon.

Typical pedon of Tichnor silt loam, frequently flooded, in a woodland SE1/4NE1/4SW1/4 of sec. 23, T. 5 N., R. 9 W.

O1—1 inch to 0; partly decomposed plant material.

A1—0 to 2 inches; grayish brown (10YR 5/2) silt loam; common medium faint gray (10YR 6/1) mottles;

weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

A21g—2 to 8 inches; light gray (10YR 7/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine roots; common pores; few black and brown soft accumulations; very strongly acid; clear smooth boundary.

A22g—8 to 22 inches; light gray (10YR 7/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles and many fine yellowish red (5YR 4/6) root stains; weak medium subangular blocky structure; friable; many fine roots; common pores; few black and brown soft accumulations; very strongly acid; clear wavy boundary.

B21tg—22 to 48 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots and pores; continuous clay films on faces of peds; thin coatings of light gray silt on peds in lower part; few black stains and soft accumulations; very strongly acid; gradual wavy boundary.

B22tg—48 to 60 inches; gray (10YR 6/1) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots and continuous clay films on faces of peds; few vertical seams of silty clay about one-half inch wide; silt coatings on some peds; few black and brown soft accumulations; very strongly acid; clear wavy boundary.

B3g—60 to 72 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots and pores; few seams of silt loam; very strongly acid.

The thickness of the solum ranges from 50 to 72 inches or more. Reaction is very strongly acid or strongly acid throughout.

The A1 or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The A2g horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Few to common fine or medium mottles in shades of yellow and brown are throughout the horizon. The A horizon ranges from 20 to 28 inches thick. The B2tg horizon has hue of 10YR with value of 5 and chroma of 1 or value of 6 and chroma or 1 or 2. It has common to many medium mottles in shades of yellow and brown. Texture is silt loam or silty clay loam. The B3g horizon has the same color range as the B2tg horizon but texture ranges from silt loam to silty clay.

formation of the soils

In this section the factors of soil formation are discussed and related to the soils in the survey area. In addition, the processes of soil formation are described.

factors of soil formation

Soil is formed by weathering and other processes that act upon the soil. The characteristics of the soil at any given point depend upon climate, living organisms, parent material, relief, and time. Each factor acts on the soil and modifies the effect of the other four. When climate, living organisms, or any one of the five factors is varied to a significant extent, a different soil may be formed.

Climate and living organisms are the active forces in soil formation. Relief modifies the effects of climate and living organisms, mainly by its influence on temperature and runoff. Because climate, vegetation, parent material, and relief interact over a period of time, time is the fifth factor of soil formation. Therefore, the effect of time is also reflected in the soil characteristics.

The interaction of the five factors of soil formation is more complex for some soils than for others. The five factors and how they interact to form some of the soils in White County are discussed in the following paragraphs.

climate

The climate of White County is characterized by mild winters, warm or hot summers, and generally abundant rainfall. The generally warm temperatures and high precipitation probably are similar to the climate in which the soils formed. The average temperature at Searcy during July is about 81 degrees and during January is about 39 degrees. The total annual rainfall is about 52 inches and is well distributed throughout the year. For additional information about the climate, refer to the section "General nature of the county."

The warm, moist climate promotes rapid soil formation. The warm temperature permits rapid chemical reactions. Abundant rainfall makes a larger amount of water available for moving dissolved or suspended material downward in the soil profile. As a result the remains of plants decompose rapidly and produce organic acids that hasten the development of clay minerals and removal of carbonates. Because the soil is frozen to only shallow depths and for a short period, these soil-forming processes can continue almost the year round. The climate throughout the county is relatively uniform, but its effect is modified locally by runoff and slope. Climate alone does not account for differences in the soils of White County.

living organisms

The higher plants and animals, as well as insects, bacteria, and fungi, are important in the formation of soils. Among the changes they cause are gains in organic matter and the addition of nitrogen to the soil, gains or losses in other plant nutrients, and changes in structure and porosity.

Before White County was settled, the native vegetation probably had more influence on soil formation than did animal activity. Hardwood forest, broken by swamps and a few canebrakes, covered the White River flood plains. The loess and alluvial terrace area in the eastern part of the county was also covered by hardwood forests with, perhaps, a few interspersed pine. The valleys and ridges in the western part of the county had hardwood or mixed pine and hardwood on the deeper soils and savannas of scattered hardwood with an understory of grasses on the shallower soils.

Stands of baldcypress and water tupelo filled the swampy areas where some of the Kobel soils formed; but throughout the remainder of the White River flood plain and the flood plains in the lower reaches of its tributaries, green ash, eastern cottonwood, cherrybark oak, American sycamore, pecan, water oak, and water hickory were the common species of trees. Commerce, Kobel, Oaklimeter, Robinsonville, and Tichnor soils formed in these areas.

In the older alluvial and loess terrace area, the native vegetation was mainly green ash, cherrybark oak, water oak, and willow oak where the Calhoun and Jackport soils formed. Some of the Crowley soils formed under this type of tree cover, but post oak and hickory were the native vegetation where most of the Crowley soils formed. Mixed upland oaks, hickory, and sweetgum, perhaps interspersed with pine, were common to the Calloway, Gore, and Loring soils.

In the western part of the county, the valleys and ridges had mixed stands mainly of shortleaf pine, southern red oak, white oak, hickory, and blackgum. Soils such as Enders, Leadvale, Linker, Nauvoo, Steprock, and Sidon soils formed under this type of forest cover. Where bedrock is at a shallow depth, Mountainburg and some of the Linker and Steprock soils

formed under a cover of scattered post oak and blackjack oak with an understory of tall grasses such as big bluestem, little bluestem, and indiangrass. On the stream bottoms, where the Barling, Nugent, Rexor, and Spadra soils formed, the native vegetation was mainly southern red oak, cherrybark oak, sweetgum, and eastern cottonwood.

Man is most important to the future rate and direction of soil formation. He clears the forests, cultivates the soils, and introduces new kinds of plants. He adds fertilizers and lime and also chemicals for insect, disease, and weed control. Building levees for flood control, improving drainage, grading and smoothing the surface, and controlling fire also affect the future formation of soils. Some results may not be evident for many centuries. Nevertheless, the complex of living organisms affecting soil formation in this county has been drastically changed by man.

parent material

White County is on the boundary between the broad reaches of the Southern Mississippi River alluvium and the Southern Mississippi Valley silty uplands to the east and the Arkansas Valley and ridges to the west. Consequently, the soils of the county formed in parent materials of considerable variety.

The flood plain of White River, which forms the eastern boundary of White County, is superimposed on a flood plain that the Mississippi River occupied before it breached Crowleys Ridge to occupy its present flood plain. The alluvium in the eastern part of the county is a mixture of materials from the Mississippi River Basin, which extends from Montana to Pennsylvania. This material had a high content of bases and weatherable minerals, and some of it was calcareous. Most of these materials have been reworked by the meandering action of the White River. As the river overflowed its banks, the coarser sediments dropped out first and formed natural levees along the channel. The Robinsonville soils, high in content of sand, formed here. As the floodwaters continued to spread, the finer sediments, such as silt, were deposited and were generally mixed with some sand and clay. Commerce soils, high in silt, formed here on the floodplain. The clay and finer silt particles remained to settle out in backswamp slack water areas where the clayey Kobel soils formed.

The backswamps of clayey material abandoned by the Mississippi River, and in some places by the Arkansas River, were subsequently drained or entrenched by more localized streams. Those parts of the abandoned flood plain were gradually mantled with loess high in silt that was blown from the alluvial surfaces of the Mississippi River Valley. This area extends to the Arkansas valleys and ridges to the west. Where loess is thinner over backswamp clays, Crowley soils formed. Where there are lenses in the thinnest loess deposits, Gore and Jackport soils formed. Calhoun, Calloway, and Loring soils formed where the loess was thickest. Oaklimeter and Tichnor soils formed on the bottoms of streams meandering through the area, cutting, reworking, and receiving the loessial material from the adjacent terraces. The high concentration of sodium and magnesium of some of this parent material is reflected in the Bonn soils.

The parent materials in the western part of the county range from slightly tilted to level-bedded, acid sandstone, siltstone, and shale of the Atoka Formation. These sedimentary rocks include coarse-grained sandstone, fine-grained sandstone or siltstone, shaly sandstone, sandy shale, and clayey shale, all of which are interbedded. The soils of the Arkansas Valley and ridges formed in material weathered in place from these materials or in materials washed from these sources. This material was acidic and low in bases and weatherable minerals.

Leadvale, Taft, and Guthrie soils formed in the valleys where the siltstone, shale, or silty sediment that washed from adjacent ridges is the dominant material. Allen soils in similar positions formed in material containing more sand. On the sides of ridges where shale and siltstone are the dominant materials, Enders and Steprock soils formed. On the benches and ridgetops underlain by sandstone, the Linker, Mountainburg, Nauvoo, and Sidon soils formed. The Barling, Nugent, Rexor, and Spadra soils formed in alluvial material washed from all these sources.

relief

Relief, or the inequality in elevation, was brought about in White County by the uplift of the Paleozoic rocks and subsequent entrenchment of drainage channels into the land surface. It is most evident in the escarpment that occurs where the Atoka Formation joins the Mississippi Embayment in the eastern part of the county. The highest elevation in the county, about 672 feet above sea level, is on the ridges in the western part. The lowest elevation about 180 feet above sea level, is only a few miles away, near the place where the White River leaves the county.

Some of the greatest differences in the soils of White County are caused by the effect of relief on drainage, runoff, erosion, and percolation of water through the soil.

In the bottom land areas in the eastern part of White County, there is little difference in local elevations, which results in water being ponded or drained away slowly. As a consequence, with few exceptions, the soils show evidence of gleying and have a B horizon because more water must percolate through them than where relief facilitates drainage. The Commerce, Kobel, Oaklimeter, and Tichnor soils show the effects of reduced runoff by some gleying. The thick A2 horizon, caused by large amounts of water moving through the profile, further exhibits the effects of relief on the Tichnor soils.

Differences in elevation are negligible on the broad divides between the streams on the alluvial and aeolian

terrace in the eastern part of the county. Noticeable differences are mostly along the valley walls of the streams which are entrenched 5 to 25 feet below the general ground level. The level Calhoun, Calloway, Crowley, and Jackport soils show the effects of impeded drainage. The Gore and Loring soils, dominantly along the more sloping valley walls, are moderately well drained.

Inequalities of elevation range up to hundreds of feet in the western part of the county. Differences are commonly 200 to 350 feet between the ridgetop and valley floor. On the ridgetops, however, and within the valleys, elevation seldom varies more than 50 feet.

Slopes on tops and sides of ridges are shaped so that excess water is removed soon after it falls on the surface. Even when precipitation is more than sufficient to saturate, the soils are saturated for only short periods during and after rainfall or snowfall. Consequently, the soils are moderately well drained or well drained, though some are slowly permeable. This is reflected by the dominantly brown or red colors of Enders, Linker, Mountainburg, Steprock, and Sidon soils that formed on these ridges. The differences in the depth of these soils is related to relief and its effect on water velocity, which determines the size of soil particles that can be moved and rate of their removal into the valleys below.

Slopes within the valleys generally have less gradient than on ridges. Generally the soils in the valleys are accumulations of material washed or sloughed down from adjacent higher soils. Guthrie and Taft soils formed in this material where surface drainage was impeded, and the Allen and Leadvale soils formed in areas of more normal relief.

The well drained Spadra and Rexor soils, the excessively drained Nugent soils, and the moderately well drained Barling soils, all on bottom land in the valleys, show little or no effect of relief.

time

The length of time required for formation of a soil depends largely on other factors of soil formation. Less time generally is needed if the climate is warm and humid and the vegetation is luxuriant. When other factors are equal, less time also is needed for sandy or loamy parent material than for clayey parent material. In terms of geologic time and of soil formation, the soils of White County range from relatively young to old. Soil age, however, does not always coincide with geologic time.

It seems probable that the material now forming the surface of the Mississippi Embayment in the eastern part of the county was deposited during and after the continental glaciers. The last of these glaciers retreated from the north-central states about 11,000 years ago. The Robinsonville soils on the flood plain of the White River have accumulated sediments so recently that they are little affected by the other factors of soil formation. Other soils, such as Commerce, Kobel, and Oaklimeter soils, have accumulated sediments slower and had time to develop cambic horizons. The Tichnor soils, which accumulated sediment much slower, have an argillic horizon.

The soils on the adjacent alluvial and eolian terrace all have had sufficient time for moderate amounts of leaching, removal of bases, and the accumulation of clay in the argillic horizon. Some have developed a thick A2 horizon. Calhoun, Calloway, Crowley, Gore, Jackport, and Loring soils have some characteristics in common because they are related in age.

The soils in the Arkansas Valley and on Ridges formed in material weathered from rocks of the Atoka Formation of Pennsylvanian Age. Most of these soils are old. Most of the cations have been leached out, the reaction is strongly acid or very strongly acid, there has been considerable weathering and translocation of clay, and the argillic horizon is clearly expressed. Iron, as well as clay, has been translocated from the A to the B horizon and then oxidized, causing the B horizon to have stronger red, brown, and yellow colors than the A horizon. Allen, Enders, Linker, Mountainburg, Nauvoo, Sidon, and Steprock soils clearly show the impact of time acting with other soil forming factors on parent material.

In the valleys, the Guthrie, Leadvale, and Taft soils all show the imprint of time mainly in the fragipan that developed in the middle or lower part of the subsoil. Like the adjacent higher soils, they have also been heavily leached.

On the bottom lands in the valleys, the Rexor and Spadra soils have been in place long enough for translocation of clay and formation of an argillic horizon. The younger Barling soils have been in place only long enough to form a cambic horizon. The much younger Nugent soils on natural levees adjacent to streams exhibited few profile characteristics that show the effects of time.

processes of soil formation

In this section a brief definition of the horizon nomenclature and processes responsible for soil formation are given. The effects of the soil-forming factors are evident in the soil profile, which is a succession of layers, or horizons, that extend from the surface to the parent rock. The horizons differ in one or more properties, such as color, texture, structure, consistence, and porosity. Most soil profiles contain three major horizons, called A, B, and C. Very young soils do not have a B horizon.

The A horizon can be the horizon of maximum accumulation of organic matter, which is called the A1 horiozn or the surface layer; or it can be the horizon of maximum leaching of dissolved or suspended materials, which is called the A2 horizon or the subsurface layer.

The B horizon lies immediately beneath the A horizon and is sometimes called the subsoil (*10*). It is a horizon

of maximum accumulation of suspended materials, such as clay and iron. Commonly, the B horizon has a blocky structure and is firmer than the horizons immediately above and below it.

Beneath the B horizon is the C horizon, which has been little affected by the soil-forming processes, though the C horizon can be materially modified by weathering. In some young soils, the C horizon immediately underlies the A horizon and has been slightly modified by living organisms as well as by weathering.

Several processes have been active in the formation of soil horizons in White County. Among these processes are (1) the accumulation of organic matter, (2) the leaching of bases, (3) the oxidation or reduction and transfer of iron, and (4) the formation and translocation of silicate clay minerals. In most of the soils of the county, more than one of these processes have been active in soil formation.

Physical weathering of rocks through heating and cooling and through wetting and drying slowly breaks the rocks into small pieces that form the parent material for the residual soils in the county. This is most evident in the Linker, Mountainburg, and Steprock soils.

The accumulation of organic matter in the upper part of the profile to form an A1 horizon is an important process of soil formation. The A1 horizon is most evident in profiles that have a light-colored subsurface layer from which organic matter, clay, and iron oxides have been removed. This process is readily evident in the Bonn, Calhoun, Crowley, and Tichnor soils.

Leaching of bases has occurred to some degree in nearly all the soils of White County. Bases are leached downward in soils before silicate clay minerals begin to move. Most of the soils in the county are moderately leached, an important factor in horizon development. Some, such as Bonn soils, are only slightly leached, whereas others, such as the Enders, Linker, and Mountainburg soils, are strongly leached.

Oxidation of iron is evident in the moderately well drained and well drained soils in the county. Oxidation of iron is indicated by the red and brown colors in the B horizon of soils such as the Enders, Linker, and Mountainburg soils on the ridges, the Leadvale soils on terraces, and the Spadra soils on the older natural levees of streams in the western part of the county.

Reduction and transfer of iron has occurred to a significant degree in the poorly drained and somewhat poorly drained soils. In the naturally wet soils, this process is called gleying. Gray colors in the horizons below the surface indicate the reduction and loss of iron. Some horizons have reddish or yellowish mottles, as in the B horizon of Crowley soils, and concretions derived from segregated iron are commonly on the surface of some poorly drained soils. Gleying is most pronounced in the Guthrie, Kobel, Jackport, and Tichnor soils.

Translocation of silicate clay minerals has contributed to horizon development in most of the soils in the county. In cultivated areas, especially in the well drained soils, most of the eluviated A2 horizon has been destroyed, but where translocation is still evident the structure is blocky or platy; there is less clay than in the lower horizons; and the horizon is lighter in color. Generally, clay films accumulate in pores and on surfaces of peds in the B horizon. The soils of the county were probably leached of carbonates and soluble salts to a great extent before translocation of silicate clay occurred, even though the content of bases is still high in some of the soils on the alluvial and eolian terrace in the eastern part of the county.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils of White County.

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glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected

scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently

ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the

overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction

because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Searcy, Arkansas]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	50.1	28.8	39.5	75	5	27	4.12	1.88	6.03	6	2.1
February---	55.2	32.6	43.9	77	11	47	3.78	2.00	5.33	6	1.2
March------	63.6	39.9	51.7	85	18	177	5.59	2.90	7.94	8	.4
April------	74.7	50.2	62.5	89	31	375	4.80	2.43	6.86	7	.0
May--------	82.3	58.2	70.2	94	40	626	5.34	2.72	7.62	7	.0
June-------	89.7	65.7	77.7	100	50	831	3.80	1.77	5.59	6	.0
July-------	93.4	69.5	81.5	103	57	977	3.97	1.77	5.83	6	.0
August-----	92.4	67.6	80.0	104	54	930	3.97	1.58	5.98	5	.0
September--	85.8	61.4	73.6	99	43	708	4.19	1.43	6.46	5	.0
October----	76.3	48.9	62.6	92	29	396	2.67	.92	4.12	4	.0
November---	62.8	39.1	51.0	82	17	107	4.63	2.11	6.77	6	.2
December---	52.9	32.2	42.6	75	9	27	4.53	2.49	6.33	7	.4
Yearly:											
Average--	73.3	49.5	61.4	---	---	---	---	---	---	---	---
Extreme--	---	---	---	105	2	---	---	---	---	---	---
Total----	---	---	---	---	---	5,228	51.39	43.09	59.32	73	4.3

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Searcy, Arkansas]

Probability	Temperature 24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 25	April 3	April 14
2 years in 10 later than--	March 18	March 28	April 9
5 years in 10 later than--	March 4	March 17	March 31
First freezing temperature in fall:			
1 year in 10 earlier than--	November 2	October 28	October 18
2 years in 10 earlier than--	November 8	November 1	October 22
5 years in 10 earlier than--	November 19	November 9	October 30

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Searcy, Arkansas]

Probability	Daily minimum temperature during growing season: Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	233	216	194
8 years in 10	242	223	200
5 years in 10	260	237	212
2 years in 10	277	250	224
1 year in 10	287	257	231

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Allen fine sandy loam, 3 to 8 percent slopes	4,736	0.7
2	Barling silt loam, occasionally flooded	18,659	2.8
3	Bonn silt loam, 0 to 1 percent slopes	2,159	0.3
4	Calhoun silt loam, 0 to 1 percent slopes	40,967	6.1
5	Calloway silt loam, 0 to 1 percent slopes	39,376	5.9
6	Commerce silty clay loam, frequently flooded	9,327	1.4
7	Crowley silt loam, 0 to 1 percent slopes	16,712	2.5
8	Enders fine sandy loam, 3 to 8 percent slopes	3,009	0.5
9	Enders gravelly fine sandy loam, 8 to 12 percent slopes	3,656	0.5
10	Enders stony fine sandy loam, 3 to 12 percent slopes	4,906	0.7
11	Enders-Steprock complex, 12 to 30 percent slopes	18,588	2.8
12	Gore silt loam, 1 to 3 percent slopes	7,339	1.1
13	Guthrie silt loam, 0 to 1 percent slopes	5,975	0.9
14	Jackport silty clay loam, 0 to 1 percent slopes	17,498	2.6
15	Jackport silty clay loam, gently undulating	3,953	0.6
16	Kobel silty clay, frequently flooded	42,744	6.4
17	Leadvale silt loam, 1 to 3 percent slopes	45,396	6.8
18	Leadvale silt loam, 3 to 8 percent slopes	19,368	2.9
19	Linker fine sandy loam, 3 to 8 percent slopes	85,275	12.8
20	Linker gravelly fine sandy loam, 3 to 8 percent slopes	34,737	5.2
21	Loring silt loam, 1 to 3 percent slopes	26,752	4.0
22	Loring silt loam, 3 to 8 percent slopes	11,939	1.8
23	Mountainburg stony fine sandy loam, 3 to 12 percent slopes	15,897	2.4
24	Nauvoo fine sandy loam, 3 to 8 percent slopes	8,043	1.2
25	Nugent loamy fine sand, occasionally flooded	3,056	0.5
26	Oaklimeter silt loam, frequently flooded	10,900	1.6
27	Rexor silt loam, occasionally flooded	6,566	1.0
28	Robinsonville fine sandy loam, frequently flooded	1,124	0.2
29	Sidon loam, 1 to 3 percent slopes	12,959	1.9
30	Sidon loam, 3 to 8 percent slopes	8,326	1.2
31	Spadra fine sandy loam, occasionally flooded	1,588	0.2
32	Steprock-Enders complex, 12 to 30 percent slopes	40,962	6.1
33	Steprock-Linker complex, 3 to 8 percent slopes	16,535	2.5
34	Steprock-Mountainburg complex, 8 to 12 percent slopes	31,587	4.7
35	Taft silt loam, 0 to 2 percent slopes	14,437	2.2
36	Tichnor silt loam, frequently flooded	25,008	3.8
	Small water areas[1]	6,437	1.0
	Large water areas[2]	1,024	0.2
	Total area	667,520	100.0

[1] Enclosed areas of water less than 40 acres in size, and streams, sloughs, and canals less than one-eighth of a statute mile in width.

[2] Enclosed areas of water more than 40 acres in size, and streams, sloughs, and canals more than one-eighth of a statute mile in width.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Soybeans	Rice	Wheat	Grain sorghum	Tall fescue	Improved bermuda-grass	Bahiagrass
	Bu	Bu	Bu	Bu	AUM*	AUM*	AUM*
1 Allen	25	---	35	55	7.0	9.0	8.0
2 Barling	35	---	40	70	8.0	10.0	8.0
3 Bonn	15	---	---	---	3.0	3.0	3.0
4 Calhoun	30	120	30	70	6.0	7.0	---
5 Calloway	35	120	35	70	7.0	9.0	7.0
6 Commerce	35	---	---	70	6.0	7.0	---
7 Crowley	30	130	35	70	6.0	7.0	---
8 Enders	---	---	25	---	4.0	6.0	5.0
9 Enders	---	---	---	---	4.0	6.0	5.0
10 Enders	---	---	---	---	4.0	6.0	5.0
11 Enders-Steprock	---	---	---	---	---	---	---
12 Gore	20	---	30	55	6.0	7.0	6.5
13 Guthrie	30	---	25	---	5.0	6.0	---
14, 15 Jackport	35	130	---	70	6.0	7.0	---
16 Kobel	30	---	---	70	6.0	7.0	---
17 Leadvale	30	---	40	---	7.0	9.0	7.0
18 Leadvale	25	---	35	---	6.5	8.0	6.5
19, 20 Linker	20	---	30	---	6.0	7.5	6.5
21 Loring	30	---	40	65	8.0	10.0	8.0
22 Loring	25	---	35	55	7.0	9.0	7.0
23 Mountainburg	---	---	---	---	3.0	4.0	4.0

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Soybeans	Rice	Wheat	Grain sorghum	Tall fescue	Improved bermuda-grass	Bahiagrass
	Bu	Bu	Bu	Bu	AUM*	AUM*	AUM*
24------------------------ Nauvoo	25	---	35	55	7.0	9.0	8.0
25------------------------ Nugent	15	---	25	---	4.0	5.0	4.0
26------------------------ Oaklimeter	30	---	---	60	6.0	7.0	---
27------------------------ Rexor	30	---	40	70	7.0	10.0	8.0
28------------------------ Robinsonville	30	---	35	---	6.0	7.0	6.0
29------------------------ Sidon	25	---	40	55	6.5	8.0	7.0
30------------------------ Sidon	20	---	35	---	6.0	7.5	6.5
31------------------------ Spadra	30	---	35	---	8.0	9.0	8.0
32------------------------ Steprock-Enders	---	---	---	---	---	---	---
33------------------------ Steprock-Linker	15	---	25	---	5.0	6.0	5.0
34------------------------ Steprock-Mountainburg	---	---	---	---	---	---	---
35------------------------ Taft	30	---	30	60	6.0	8.0	6.0
36------------------------ Tichnor	25	---	---	---	5.0	6.0	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Wood-land suit-ability group	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
1 Allen	3o7	Slight	Slight	Slight	Loblolly pine Shortleaf pine	70 72	Loblolly pine, black walnut, red oak, shortleaf pine.
2 Barling	2o7	Slight	Slight	Slight	Southern red oak Sweetgum Eastern cottonwood Shortleaf pine American sycamore	80 90 95 80 ---	Eastern cottonwood, American sycamore, shortleaf pine, loblolly pine, sweetgum, green ash, Shumard oak, cherrybark oak.
4 Calhoun	3w9	Slight	Severe	Moderate	Loblolly pine Cherrybark oak Sweetgum Water oak	84 --- --- ---	Loblolly pine, sweetgum, red oak.
5 Calloway	2w8	Slight	Moderate	Slight	Cherrybark oak Loblolly pine Shortleaf pine Sweetgum Water oak	90 90 80 90 90	Loblolly pine, cherrybark oak, sweetgum, water oak, shortleaf pine.
6 Commerce	1w5	Slight	Moderate	Slight	Green ash Eastern cottonwood Water oak Pecan American sycamore	80 120 110 --- ---	Eastern cottonwood, American sycamore.
7 Crowley	3w9	Slight	Severe	Moderate	Loblolly pine Southern red oak Water oak Sweetgum	83 --- --- ---	Loblolly pine.
8, 9 Enders	4o1	Slight	Slight	Slight	Southern red oak White oak Shortleaf pine	60 55 60	Loblolly pine, shortleaf pine, eastern redcedar.
10 Enders	4x2	Slight	Moderate	Slight	Southern red oak White oak Eastern redcedar Shortleaf pine	60 55 40 60	Loblolly pine, shortleaf pine, eastern redcedar.
11*:							
Enders	4x2	Moderate	Moderate	Slight	Southern red oak White oak Eastern redcedar Shortleaf pine	60 55 40 60	Loblolly pine, shortleaf pine, eastern redcedar.
Steprock	4x2	Moderate	Moderate	Slight	Shortleaf pine Southern red oak White oak Eastern redcedar Loblolly pine	60 45 45 35 ---	Shortleaf pine, loblolly pine, eastern redcedar.
12 Gore	3c2	Slight	Moderate	Moderate	Loblolly pine Shortleaf pine White oak Southern red oak	76 66 --- ---	Loblolly pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
13 Guthrie	2w9	Slight	Severe	Severe	Southern red oak Loblolly pine Willow oak Sweetgum	76 80 86 80	Loblolly pine, sweetgum, southern red oak, willow oak.
14, 15 Jackport	2w6	Slight	Severe	Moderate	Green ash Cherrybark oak Water oak Willow oak Sweetgum	80 90 90 90 90	Green ash, eastern cottonwood, Nuttall oak, willow oak, sweetgum, American sycamore.
16 Kobel	3w6	Slight	Severe	Severe	Green ash Eastern cottonwood Water oak American sycamore Water hickory	75 90 80 --- ---	Eastern cottonwood, sweetgum.
17, 18 Leadvale	3o7	Slight	Slight	Slight	White oak Loblolly pine Shortleaf pine Southern red oak	70 80 70 ---	Loblolly pine, shortleaf pine.
19, 20 Linker	4o1	Slight	Slight	Slight	Shortleaf pine Southern red oak White oak Eastern redcedar Loblolly pine	60 64 60 40 66	Shortleaf pine, loblolly pine, eastern redcedar.
21, 22 Loring	3o7	Slight	Slight	Slight	Cherrybark oak Sweetgum Southern red oak Loblolly pine Water oak	86 90 76 85 86	Loblolly pine, southern red oak.
23 Mountainburg	5x3	Slight	Severe	Moderate	Shortleaf pine Eastern redcedar Loblolly pine	54 30 ---	Shortleaf pine, eastern redcedar, loblolly pine.
24 Nauvoo	2o7	Slight	Slight	Slight	Loblolly pine Shortleaf pine Southern red oak Sweetgum	89 80 --- 90	Loblolly pine, shortleaf pine, sweetgum.
25 Nugent	2s8	Slight	Moderate	Moderate	Loblolly pine Shortleaf pine Sweetgum Water oak Willow oak	90 84 95 85 85	Loblolly pine, sweetgum, water oak.
26 Oaklimeter	1w8	Slight	Moderate	Moderate	Cherrybark oak Eastern cottonwood Green ash Loblolly pine Willow oak Sweetgum	100 100 90 96 100 100	Cherrybark oak, eastern cottonwood, loblolly pine, Nuttall oak, sweetgum, water oak.
27 Rexor	2o7	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum White oak Southern red oak Black walnut	90 80 --- --- --- ---	Loblolly pine, sweetgum, black walnut.
28 Robinsonville	1w5	Slight	Moderate	Moderate	Eastern cottonwood Green ash Pecan American sycamore	110 85 --- 115	Eastern cottonwood, sweetgum, American sycamore.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
29, 30. Sidon	3o7	Slight	Slight	Slight	Southern red oak	---	Loblolly pine, shortleaf pine.
					White oak	---	
					Shortleaf pine	70	
					Loblolly pine	---	
31. Spadra	2o7	Slight	Slight	Slight	Shortleaf pine	80	Loblolly pine, shortleaf pine, black walnut, black locust, southern red oak, eastern redcedar.
					Southern red oak	80	
					Loblolly pine	---	
32*:							
Steprock	4r2	Moderate	Moderate	Moderate	Shortleaf pine	58	Shortleaf pine, loblolly pine, eastern redcedar.
					Southern red oak	45	
					White oak	45	
					Eastern redcedar	35	
					Loblolly pine	---	
Enders	4r2	Moderate	Moderate	Moderate	Eastern redcedar	40	Eastern redcedar.
					Shortleaf pine	60	
33*:							
Steprock	4o1	Slight	Slight	Slight	Shortleaf pine	58	Shortleaf pine, loblolly pine, eastern redcedar.
					Southern red oak	45	
					White oak	45	
					Eastern redcedar	35	
					Loblolly pine	---	
Linker	4o1	Slight	Slight	Slight	Shortleaf pine	60	Shortleaf pine, loblolly pine, eastern redcedar.
					Southern red oak	64	
					White oak	60	
					Eastern redcedar	40	
					Loblolly pine	66	
34*:							
Steprock	4o1	Slight	Slight	Slight	Shortleaf pine	58	Shortleaf pine, loblolly pine, eastern redcedar.
					Southern red oak	45	
					White oak	45	
					Eastern redcedar	35	
					Loblolly pine	---	
Mountainburg	5d2	Slight	Slight	Moderate	Shortleaf pine	50	Shortleaf pine, eastern redcedar, loblolly pine.
					Eastern redcedar	30	
					Loblolly pine	---	
35. Taft	3w8	Slight	Moderate	Moderate	White oak	60	Loblolly pine.
					Loblolly pine	76	
					Sweetgum	76	
					Shortleaf pine	60	
36. Tichnor	1w6	Slight	Severe	Moderate	Eastern cottonwood	106	Eastern cottonwood, Nuttall oak, cherrybark oak, sweetgum, American sycamore, green ash, water oak.
					Cherrybark oak	96	
					Sweetgum	100	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1 Allen	Slight	Slight	Severe: slope.	Slight.
2 Barling	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight.
3 Bonn	Severe: wetness, percs slowly, excess sodium.	Severe: wetness, excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.
4 Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
5 Calloway	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
6 Commerce	Severe: flooding.	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Moderate: wetness, flooding.
7 Crowley	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.
8 Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight.
9 Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Severe: erodes easily.
10 Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Severe: erodes easily.
11*:				
Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: erodes easily.
Steprock	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
12 Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight.
13 Guthrie	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
14, 15 Jackport	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
16------------------- Kobel	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.
17, 18--------------- Leadvale	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight.
19------------------- Linker	Slight---------------	Slight---------------	Moderate: slope.	Slight.
20------------------- Linker	Moderate: small stones.	Moderate: small stones.	Moderate: slope, small stones.	Slight.
21, 22--------------- Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight.
23------------------- Mountainburg	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones.
24------------------- Nauvoo	Slight---------------	Slight---------------	Moderate: slope.	Slight.
25------------------- Nugent	Severe: flooding.	Slight---------------	Moderate: flooding.	Slight.
26------------------- Oaklimeter	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.
27------------------- Rexor	Severe: flooding.	Slight---------------	Moderate: flooding.	Slight.
28------------------- Robinsonville	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.
29, 30--------------- Sidon	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: slope, percs slowly, wetness.	Slight.
31------------------- Spadra	Severe: flooding.	Slight---------------	Moderate: flooding.	Slight.
32*:				
Steprock-------------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope, large stones.
Enders---------------	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: erodes easily.
33*:				
Steprock-------------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
33*:				
Linker	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
34*:				
Steprock	Moderate: small stones, slope.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight.
Mountainburg	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
35 Taft	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
36 Tichnor	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1 Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2 Barling	Fair	Good	Good	Good	Poor	Poor	Poor	Good	Good	Poor.
3 Bonn	Poor	Poor	Poor	Poor	---	Poor	Good	Poor	Poor	Fair.
4 Calhoun	Poor	Fair	Fair	Good	---	Good	Good	Fair	Fair	Good.
5 Calloway	Fair	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
6 Commerce	Poor	Fair	Fair	Good	---	Fair	Fair	Fair	Good	Fair.
7 Crowley	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
8, 9 Enders	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10 Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
11*:										
Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Steprock	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
12 Gore	Fair	Good	Good	---	Fair	Poor	Poor	Good	Fair	Poor.
13 Guthrie	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
14 Jackport	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
15 Jackport	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair.
16 Kobel	Poor	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
17 Leadvale	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
18 Leadvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19, 20 Linker	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
21 Loring	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
22----------------- Loring	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
23----------------- Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
24----------------- Nauvoo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25----------------- Nugent	Fair	Poor	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
26----------------- Oaklimeter	Poor	Fair	Good	Good	Poor	Poor	Poor	Fair	Good	Poor.
27----------------- Rexor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
28----------------- Robinsonville	Poor	Fair	Fair	Good	---	Poor	Very poor.	Fair	Good	Very poor.
29----------------- Sidon	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
30----------------- Sidon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
31----------------- Spadra	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
32*:										
Steprock-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Enders-------------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
33*:										
Steprock-----------	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Linker-------------	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
34*:										
Steprock-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Poor	Very poor.
Mountainburg-------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
35----------------- Taft	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
36----------------- Tichnor	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1 Allen	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
2 Barling	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
3 Bonn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.
4 Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.
5 Calloway	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
6 Commerce	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.
7 Crowley	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.
8 Enders	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
9 Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
10 Enders	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
11*:					
Enders	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Steprock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
12 Gore	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
13 Guthrie	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.
14, 15 Jackport	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
16----------------- Kobel	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.
17----------------- Leadvale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.
18----------------- Leadvale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.
19, 20------------- Linker	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
21----------------- Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.
22----------------- Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.
23----------------- Mountainburg	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.
24----------------- Nauvoo	Slight------------	Slight------------	Slight------------	Moderate: slope.	Moderate: low strength.
25----------------- Nugent	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
26----------------- Oaklimeter	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.
27----------------- Rexor	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
28----------------- Robinsonville	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
29----------------- Sidon	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.
30----------------- Sidon	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: low strength, wetness.
31----------------- Spadra	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
32*:					
Steprock----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Enders------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
33*:					
Steprock	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight.
Linker	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
34*:					
Steprock	Moderate: depth to rock.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.
Mountainburg	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
35 Taft	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
36 Tichnor	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1 Allen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
2 Barling	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Fair: wetness.
3 Bonn	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
4 Calhoun	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
5 Calloway	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
6 Commerce	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: thin layer.
7 Crowley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
8 Enders	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
9 Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
10 Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
11*:					
Enders	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Steprock	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope, thin layer.
12 Gore	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
13 Guthrie	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14, 15 Jackport	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
16 Kobel	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
17, 18 Leadvale	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Fair: area reclaim, too clayey.
19, 20 Linker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
21, 22 Loring	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
23 Mountainburg	Severe: depth to rock, large stones.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
24 Nauvoo	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight	Fair: area reclaim.
25 Nugent	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage.
26 Oaklimeter	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness, too clayey.
27 Rexor	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
28 Robinsonville	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
29, 30 Sidon	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock.	Moderate: wetness, depth to rock.	Fair: area reclaim, too clayey.
31 Spadra	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
32*:					
Steprock	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Enders	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
33*:					
Steprock	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Linker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
34*:					
Steprock	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Mountainburg	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, seepage, small stones.
35 Taft	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
36 Tichnor	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1. Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
2. Barling	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3. Bonn	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
4. Calhoun	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
5. Calloway	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
6. Commerce	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
7. Crowley	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
8, 9, 10. Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
11*:				
Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
Steprock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
12. Gore	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
13. Guthrie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
14, 15. Jackport	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
16. Kobel	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
17, 18. Leadvale	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
19, 20. Linker	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
21, 22: Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
23: Mountainburg	Poor: area reclaim, large stones, thin layer.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, thin layer.
24: Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
25: Nugent	Good	Probable	Improbable: too sandy.	Fair: too sandy.
26: Oaklimeter	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
27: Rexor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
28: Robinsonville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
29, 30: Sidon	Fair: thin layer, wetness, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, thin layer.
31: Spadra	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
32*:				
Steprock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
33*:				
Steprock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Linker	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
34*:				
Steprock	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Mountainburg	Poor: thin layer, area reclaim.	Improbable: thin layer, excess fines.	Improbable: thin layer.	Poor: small stones, area reclaim, thin layer.
35: Taft	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
36: Tichnor	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
1 Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
2 Barling	Moderate: seepage.	Severe: piping.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Favorable.
3 Bonn	Slight	Severe: wetness, excess sodium.	Percs slowly, excess sodium.	Wetness, droughty, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, percs slowly.
4 Calhoun	Slight	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Wetness, percs slowly.
5 Calloway	Moderate: seepage.	Severe: piping.	Percs slowly	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, rooting depth, percs slowly.
6 Commerce	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Erodes easily, wetness.	Favorable.
7 Crowley	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.
8 Enders	Moderate: depth to rock.	Moderate: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
9 Enders	Moderate: depth to rock.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
10 Enders	Moderate: depth to rock.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, slope.
11*:						
Enders	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Steprock	Severe: slope.	Severe: piping, seepage.	Deep to water	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
12 Gore	Slight	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
13 Guthrie	Slight	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, rooting depth, percs slowly.
14, 15 Jackport	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.
16 Kobel	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
17----------------- Leadvale	Moderate: seepage, depth to rock.	Severe: piping.	Percs slowly---	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth, percs slowly.
18----------------- Leadvale	Moderate: seepage, depth to rock.	Severe: piping.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth, percs slowly.
19----------------- Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
20----------------- Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
21----------------- Loring	Moderate: seepage.	Severe: piping.	Favorable------	Wetness, rooting depth, erodes easily.	Erodes easily, wetness.	Erodes easily, rooting depth.
22----------------- Loring	Moderate: seepage.	Severe: piping.	Slope----------	Wetness, rooting depth, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
23----------------- Mountainburg	Severe: depth to rock, seepage.	Severe: large stones, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, depth to rock.	Large stones, droughty, depth to rock.
24----------------- Nauvoo	Moderate: seepage, depth to rock.	Moderate: thin layer, piping.	Deep to water	Slope----------	Favorable------	Favorable.
25----------------- Nugent	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy------	Droughty.
26----------------- Oaklimeter	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Favorable.
27----------------- Rexor	Moderate: seepage.	Moderate: piping.	Deep to water	Flooding, erodes easily.	Erodes easily--	Favorable.
28----------------- Robinsonville	Severe: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
29----------------- Sidon	Moderate: depth to rock, seepage.	Moderate: piping.	Percs slowly---	Percs slowly, rooting depth, wetness.	Wetness, rooting depth, erodes easily.	Percs slowly, erodes easily, rooting depth.
30----------------- Sidon	Moderate: depth to rock, seepage.	Moderate: piping.	Percs slowly, slope.	Slope, percs slowly, rooting depth.	Wetness, rooting depth, erodes easily.	Percs slowly, erodes easily, rooting depth.
31----------------- Spadra	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Favorable.
32*:						
Steprock----------	Severe: slope.	Severe: piping, seepage.	Deep to water	Large stones, depth to rock, slope.	Slope, depth to rock.	Large stones, depth to rock, slope.
Enders------------	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
33*:						
Steprock----------	Moderate: seepage, depth to rock.	Severe: piping, seepage.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
33*: Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
34*: Steprock	Moderate: seepage, depth to rock.	Severe: piping, seepage.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Mountainburg	Severe: depth to rock, seepage.	Severe: thin layer, seepage.	Deep to water	Droughty, depth to rock, slope.	Large stones, depth to rock, slope.	Large stones, slope, droughty.
35 Taft	Moderate: seepage.	Severe: piping.	Percs slowly	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
36 Tichnor	Slight	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1----------------- Allen	0-9	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-7
	9-25	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7	0-10	85-100	75-100	65-98	50-80	22-43	5-19
	25-72	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7	0-10	85-100	70-95	60-95	45-80	22-48	6-22
2----------------- Barling	0-8	Silt loam--------	ML	A-4	0	100	100	90-100	70-90	<20	NP-3
	8-34	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	100	90-100	70-90	<25	NP-6
	34-72	Silt loam, loam, very fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	<30	NP-12
3----------------- Bonn	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	75-100	<28	NP-7
	9-24	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-100	85-100	65-100	30-44	12-22
	24-72	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	95-100	90-100	75-100	28-40	8-18
4----------------- Calhoun	0-14	Silt loam--------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	14-72	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	11-24
5----------------- Calloway	0-29	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
	29-48	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-95	30-40	12-20
	48-72	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
6----------------- Commerce	0-4	Silty clay loam	CL	A-6, A-7	0	100	100	100	90-100	32-45	11-25
	4-32	Silty clay loam, silt loam, loam.	CL	A-6, A-7	0	100	100	100	85-100	32-45	11-23
	32-72	Silt loam, silty clay loam, silty clay.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	100	100	75-100	23-45	3-23
7----------------- Crowley	0-21	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<30	NP-10
	21-60	Silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	85-100	41-60	20-35
	60-72	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	85-100	38-60	18-35
8----------------- Enders	0-9	Fine sandy loam	ML, SM, SM-SC, CL-ML	A-4	0	80-100	80-97	75-90	40-85	20-35	2-10
	9-13	Clay loam, silty clay loam, loam.	CL	A-6	0	80-100	80-100	80-100	75-95	30-40	11-17
	13-35	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	65-80	30-40
	35-41	Silty clay, gravelly silty clay.	CH	A-7	0-15	70-100	65-100	60-100	60-95	65-80	30-40
	41-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
9----------------- Enders	0-8	Gravelly fine sandy loam.	ML, SM, SM-SC, CL-ML	A-2, A-4	0-15	60-95	50-75	40-70	30-60	20-35	2-10
	8-12	Clay loam, silty clay loam, loam.	CL	A-6	0	80-100	80-100	80-100	75-95	30-40	11-17
	12-34	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	65-80	30-40
	34-41	Silty clay, gravelly silty clay.	CH	A-7	0-15	70-100	65-100	60-100	60-95	65-80	30-40
	41-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---
10---------------- Enders	0-9	Stony fine sandy loam.	SM, ML, SM-SC, CL-ML	A-4, A-2	20-40	80-90	70-80	65-75	30-60	20-35	2-10
	9-13	Loam, fine sandy loam.	ML, CL, SM, SC	A-4	0-15	80-100	80-100	80-95	40-80	20-35	2-10
	13-35	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	50-65	30-40
	35-41	Silty clay, gravelly silty clay.	CH	A-7	0-15	70-100	65-100	60-100	60-95	50-65	30-40
	41-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---
11*:											
Enders-----------	0-9	Stony fine sandy loam.	SM, ML, SM-SC, CL-ML	A-4, A-2	20-40	80-90	70-80	65-75	30-60	20-35	2-10
	9-13	Loam, fine sandy loam.	ML, CL, SM, SC	A-4	0-15	80-100	80-100	80-95	40-80	20-35	2-10
	13-35	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	50-65	30-40
	35-41	Silty clay, stony silty clay.	CH	A-7	0-15	95-100	85-100	85-100	70-95	50-65	30-40
	41-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Steprock---------	0-8	Stony fine sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	10-30	70-90	60-85	55-85	30-65	10-20	NP-5
	8-29	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	SM, GM, ML, CL-ML	A-2, A-4	5-25	45-80	40-70	40-65	30-65	10-25	NP-7
	29-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
12---------------- Gore	0-12	Silt loam---------	ML, CL-ML	A-4	0	100	100	95-100	60-90	<27	NP-7
	12-59	Clay, silty clay	CH	A-7	0	100	100	95-100	85-100	53-65	28-40
	59-72	Clay--------------	CH	A-7	0	100	100	95-100	85-100	51-83	25-53
13---------------- Guthrie	0-7	Silt loam---------	ML, CL-ML	A-4	0	100	100	90-100	85-95	18-28	2-7
	7-24	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	85-95	23-39	5-15
	24-72	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0-5	85-100	80-100	75-100	66-95	20-50	4-25
14, 15------------ Jackport	0-13	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-100	30-55	12-30
	13-31	Clay--------------	CH	A-7	0	100	100	95-100	90-100	65-85	35-55
	31-72	Clay, silty clay, silty clay loam.	CH	A-7	0	100	100	95-100	90-100	51-85	25-55
16---------------- Kobel	0-9	Silty clay--------	CH	A-7	0	100	100	95-100	90-95	55-75	35-50
	9-45	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-95	45-75	25-50
	45-72	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	85-95	60-75	45-70	25-45

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
17, 18----------- Leadvale	0-5	Silt loam--------	ML, CL-ML, CL	A-4	0	100	95-100	85-95	65-85	18-32	2-10
	5-24	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0	100	95-100	90-98	75-90	22-36	3-14
	24-47	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	95-100	80-98	70-90	23-42	3-18
	47-72	Silty clay loam, silty clay, clay.	CL, MH, CH	A-6, A-7	0-5	90-100	90-100	85-95	70-90	32-58	12-26
19--------------- Linker	0-6	Fine sandy loam	SM, ML	A-4	0	85-100	80-100	70-100	40-70	<30	NP-7
	6-21	Fine sandy loam, sandy clay loam, loam.	CL, SC, SM, ML	A-4, A-6	0-10	90-100	80-100	70-100	40-80	<40	NP-18
	21-32	Gravelly sandy clay loam, gravelly fine sandy loam, sandy clay loam.	CL, SC, GC, ML	A-4, A-6	0-10	65-100	60-100	55-100	40-80	<40	NP-18
	32-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
	38-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
20--------------- Linker	0-12	Gravelly fine sandy loam.	SM, ML, GM	A-4, A-2	0-5	60-100	60-75	55-70	25-70	<30	NP-7
	12-20	Sandy clay loam, loam, clay loam.	CL, SC, SM, ML	A-4, A-6	0-10	90-100	80-100	70-100	40-80	<40	NP-18
	20-34	Gravelly sandy clay loam, gravelly fine sandy loam, sandy clay loam.	CL, SC, GC, ML	A-4, A-6	0-10	65-100	60-100	55-100	40-80	<40	NP-18
	34-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
21, 22----------- Loring	0-7	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	<35	NP-15
	7-26	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	0	100	100	95-100	90-100	32-48	8-20
	26-72	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-22
23--------------- Mountainburg	0-8	Stony fine sandy loam.	GM	A-1, A-2	30-60	40-50	30-50	20-40	15-25	<20	NP
	8-18	Very gravelly sandy clay loam, very stony loam, very stony fine sandy loam.	GM, GC, GM-GC	A-1, A-2	15-60	40-60	30-50	25-50	20-30	<30	NP-10
	18-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
24--------------- Nauvoo	0-6	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	6-32	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	32-50	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	50-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
25--------------- Nugent	0-8	Loamy fine sand	SM, SP-SM	A-2	0	85-100	75-100	60-100	10-30	<25	NP-3
	8-72	Stratified loamy sand to fine sandy loam.	SM, SP-SM	A-2	0	85-100	75-100	60-100	10-30	<25	NP-3

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
26---------------- Oaklimeter	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-8
	6-33	Very fine sandy loam, silt loam, loam.	ML, CL, CL-ML	A-4	0	100	100	85-95	60-85	<30	NP-8
	33-72	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	90-100	<30	NP-10
27---------------- Rexor	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	98-100	98-100	96-100	65-97	22-37	3-14
	7-46	Clay loam, silt loam, silty clay loam.	CL	A-4, A-6	0	98-100	98-100	96-100	80-98	30-40	8-17
	46-72	Loam, silt loam	CL	A-4, A-6	0	98-100	98-100	96-100	70-97	30-37	8-14
28---------------- Robinsonville	0-6	Fine sandy loam	SM, ML	A-4, A-2	0	100	95-100	85-95	30-80	<25	NP-3
	6-72	Stratified loamy fine sand to silt loam.	SM, ML	A-4, A-2	0	100	95-100	60-95	20-65	<25	NP-3
29, 30------------ Sidon	0-6	Loam-------------	ML, CL-ML, CL	A-4	0	100	95-100	75-90	65-85	15-25	2-10
	6-25	Silty clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	0	100	95-100	75-100	60-75	20-40	5-18
	25-41	Clay loam, loam, gravelly clay loam.	CL, SC	A-4, A-6, A-2	0	95-100	50-100	40-94	35-70	20-40	8-15
	41-53	Clay loam, loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-5	80-100	45-100	35-85	25-60	20-30	8-15
	53-55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
31---------------- Spadra	0-10	Fine sandy loam	ML, SM	A-2, A-4	0	85-100	80-100	65-80	30-75	<20	NP-3
	10-41	Loam, sandy clay loam.	CL, CL-ML	A-4, A-6	0	90-100	90-100	80-95	55-75	25-40	5-15
	41-72	Fine sandy loam, sandy loam, gravelly fine sandy loam.	ML, CL, SM, SC	A-4, A-2, A-1	0	70-100	70-100	40-85	20-65	<30	NP-10
32*:											
Steprock---------	0-3	Very flaggy loam	SM, ML, SM-SC, CL-ML	A-2, A-4	25-45	70-90	60-85	55-85	30-65	<20	NP-5
	3-9	Very flaggy loam, very flaggy fine sandy loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	25-45	70-90	60-85	55-85	30-65	<20	NP-5
	9-28	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GM, SM, ML, CL-ML	A-2, A-4	5-35	45-80	40-70	40-65	30-65	<25	NP-7
	28-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
Enders-----------	0-8	Gravelly fine sandy loam.	ML, SM, SM-SC, CL-ML	A-2, A-4	0-15	60-95	50-75	40-70	30-60	20-35	2-10
	8-12	Clay loam, silty clay loam, loam.	CL	A-6	0	80-100	80-100	80-100	75-95	30-40	11-17
	12-34	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	65-80	30-40
	34-41	Silty clay, gravelly silty clay.	CH	A-7	0-15	70-100	65-100	60-100	60-95	65-80	30-40
	41-46	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
33*:											
Steprock--------	0-6	Gravelly fine sandy loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0-10	70-90	60-85	55-85	30-65	<20	NP-5
	6-28	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GM, SM, ML, CL-ML	A-2, A-4	5-35	45-80	40-70	40-65	30-65	<25	NP-7
	28-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
Linker----------	0-12	Gravelly fine sandy loam.	ML, GM, SM	A-2, A-4	0-5	60-100	60-75	55-70	25-70	<30	NP-7
	12-20	Sandy clay loam, loam, clay loam.	CL, SC, SM, ML	A-4, A-6	0-10	90-100	80-100	70-100	40-80	<40	NP-18
	20-34	Gravelly sandy clay loam, gravelly fine sandy loam, sandy clay loam.	CL, SC, GC, ML	A-4, A-6	0-10	65-100	60-100	55-100	40-80	<40	NP-18
	34-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
	36-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
34*:											
Steprock--------	0-6	Gravelly fine sandy loam.	SM, ML, SM-SC, CL-ML	A-2, A-4	0-10	70-90	60-85	55-85	30-65	<20	NP-5
	6-28	Very gravelly sandy clay loam, very gravelly loam, very gravelly clay loam.	GM, SM, ML, CL-ML	A-2, A-4	5-35	45-80	40-70	40-65	30-65	<25	NP-7
	28-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
Mountainburg----	0-6	Gravelly fine sandy loam.	GM, SM	A-1, A-2	0-15	60-80	50-70	20-40	15-30	---	NP
	6-19	Very gravelly sandy clay loam, very gravelly sandy loam, very gravelly loam.	GM, GC, GP-GM, GM-GC	A-1, A-2	15-30	40-60	30-50	25-50	10-25	<30	NP-10
	19-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
35---------------	0-6	Silt loam--------	CL-ML, CL, ML	A-4	0	100	95-100	90-100	75-95	18-30	2-10
Taft	6-20	Silt loam, silty clay.	CL-ML, CL	A-4, A-6	0	100	95-100	95-100	85-95	23-38	5-16
	20-72	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	23-42	5-20
36--------------- Tichnor	0-22	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	<35	NP-15
	22-72	Silty clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-25

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
1----------------- Allen	0-9	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low-----------	0.24	5	.5-2
	9-25	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low-----------	0.20		
	25-72	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low-----------	0.20		
2----------------- Barling	0-8	8-17	1.25-1.60	0.6-2.0	0.13-0.24	5.1-6.5	Low-----------	0.37	5	2-4
	8-34	10-17	1.25-1.55	0.6-2.0	0.13-0.24	4.5-6.5	Low-----------	0.37		
	34-72	12-24	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low-----------	0.37		
3----------------- Bonn	0-9	5-15	1.30-1.50	0.2-0.6	0.15-0.23	4.5-7.3	Low-----------	0.55	3	.5-2
	9-24	18-35	1.40-1.75	<0.06	0.08-0.10	5.6-9.0	Low-----------	0.55		
	24-72	15-35	1.40-1.75	<0.2	0.08-0.10	6.6-9.0	Low-----------	0.55		
4----------------- Calhoun	0-14	10-27	1.30-1.65	0.2-0.6	0.21-0.23	4.5-6.0	Low-----------	0.49	3	2-4
	14-72	10-35	1.30-1.70	0.06-0.2	0.20-0.22	4.5-5.5	Moderate------	0.43		
5----------------- Calloway	0-29	10-30	1.40-1.55	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.49	1	.5-2
	29-48	10-32	1.35-1.55	0.06-0.2	0.09-0.12	4.5-6.0	Moderate------	0.43		
	48-72	16-32	1.45-1.55	0.06-0.2	0.09-0.12	5.1-7.8	Low-----------	0.43		
6----------------- Commerce	0-4	27-39	1.45-1.70	0.2-0.6	0.20-0.22	5.6-7.8	Moderate------	0.32	5	2-4
	4-32	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	Moderate------	0.32		
	32-72	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	Low-----------	0.37		
7----------------- Crowley	0-21	10-27	1.30-1.65	0.2-0.6	0.20-0.23	4.5-8.4	Low-----------	0.43	4	2-4
	21-60	35-50	1.20-1.80	<0.06	0.19-0.21	4.5-6.5	High----------	0.32		
	60-72	27-55	1.30-1.80	0.06-0.2	0.20-0.22	5.6-8.4	Moderate------	0.32		
8----------------- Enders	0-9	10-25	1.25-1.60	0.6-2.0	0.10-0.20	3.6-5.5	Low-----------	0.37	3	2-4
	9-13	15-35	1.25-1.60	0.2-0.6	0.15-0.22	3.6-5.5	Low-----------	0.43		
	13-35	35-60	1.15-1.45	<0.06	0.12-0.18	3.6-5.5	High----------	0.37		
	35-41	35-60	1.20-1.45	<0.06	0.08-0.10	3.6-5.5	Moderate------	0.37		
	41-46	---	---	---	---	---	--------------	----		
9----------------- Enders	0-8	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low-----------	0.32	3	2-4
	8-12	15-35	1.25-1.60	0.2-0.6	0.15-0.22	3.6-5.5	Low-----------	0.43		
	12-34	35-60	1.15-1.45	<0.06	0.12-0.18	3.6-5.5	High----------	0.37		
	34-41	35-60	1.20-1.45	<0.06	0.08-0.10	3.6-5.5	Moderate------	0.37		
	41-46	---	---	---	---	---	--------------	----		
10---------------- Enders	0-13	10-25	1.25-1.60	0.6-2.0	0.15-0.22	3.6-5.5	Low-----------	0.32	3	2-4
	13-35	35-60	1.15-1.45	<0.06	0.09-0.13	3.6-5.5	High----------	0.24		
	35-41	35-60	1.25-1.45	<0.06	0.11-0.13	3.6-5.5	Moderate------	0.24		
	41-46	---	---	---	---	---	--------------	----		
11*:										
Enders-----------	0-13	10-25	1.25-1.60	0.6-2.0	0.15-0.22	3.6-5.5	Low-----------	0.32	3	2-4
	13-35	35-60	1.15-1.45	<0.06	0.09-0.13	3.6-5.5	High----------	0.24		
	35-41	35-60	1.25-1.45	<0.06	0.11-0.13	3.6-5.5	Moderate------	0.24		
	41-46	---	---	---	---	---	--------------	----		
Steprock---------	0-8	8-18	1.30-1.60	2.0-6.0	0.08-0.12	4.5-5.5	Low-----------	0.20	3	.5-2
	8-29	10-35	1.30-1.60	0.6-2.0	0.06-0.10	4.5-5.5	Low-----------	0.17		
	29-48	---	---	---	---	---	--------------	----		
12---------------- Gore	0-12	5-15	1.30-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low-----------	0.43	3	.5-2
	12-59	40-60	1.30-1.75	<0.06	0.14-0.18	4.5-7.3	High----------	0.32		
	59-72	40-80	1.30-1.75	<0.06	0.14-0.18	5.6-7.8	High----------	0.32		
13---------------- Guthrie	0-7	10-25	1.35-1.55	0.6-2.0	0.20-0.22	3.6-5.0	Low-----------	0.43	3	.5-2
	7-24	18-30	1.40-1.60	0.6-2.0	0.18-0.20	3.6-5.0	Low-----------	0.43		
	24-72	18-35	1.60-1.75	0.06-0.2	0.03-0.05	3.6-5.0	Low-----------	0.43		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
14, 15----------- Jackport	0-13	30-40	1.25-1.40	0.2-0.6	0.18-0.22	4.5-6.0	Moderate-----	0.43	5	2-4
	13-31	60-80	1.15-1.30	<0.06	0.12-0.18	4.5-5.5	High---------	0.32		
	31-72	30-70	1.15-1.40	<0.06	0.12-0.18	4.5-7.8	High---------	0.32		
16--------------- Kobel	0-9	40-50	1.20-1.50	<0.06	0.14-0.18	5.1-7.3	Very high----	0.37	5	2-4
	9-45	35-55	1.15-1.50	<0.06	0.12-0.22	6.1-8.4	Very high----	0.37		
	45-72	30-50	1.20-1.50	0.06-0.2	0.14-0.22	6.6-8.4	High---------	0.37		
17, 18----------- Leadvale	0-5	12-22	1.30-1.40	0.6-2.0	0.17-0.22	4.5-5.5	Low----------	0.43	3	.5-2
	5-24	20-32	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low----------	0.43		
	24-47	20-35	1.55-1.70	0.06-0.6	0.06-0.11	4.5-5.5	Low----------	0.43		
	47-72	30-45	1.40-1.60	0.06-0.6	0.06-0.11	4.5-5.5	Low----------	0.24		
19--------------- Linker	0-6	5-20	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.28	3	.5-2
	6-21	18-35	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.32		
	21-32	18-35	1.30-1.60	0.6-2.0	0.08-0.20	3.6-5.5	Low----------	0.28		
	32-38	---	---	---	---	---	-------------	----		
20--------------- Linker	0-12	5-20	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.28	3	.5-2
	12-20	18-35	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.32		
	20-34	18-35	1.30-1.60	0.6-2.0	0.08-0.20	3.6-5.5	Low----------	0.28		
	34-36	---	---	---	---	---	-------------	----		
21, 22----------- Loring	0-7	8-18	1.3-1.5	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.43	3	.5-2
	7-26	18-35	1.4-1.5	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.43		
	26-72	12-25	1.5-1.7	0.2-0.6	0.06-0.13	4.5-6.0	Low----------	0.43		
23--------------- Mountainburg	0-8	4-12	1.30-1.60	2.0-6.0	0.05-0.10	4.5-6.0	Low----------	0.17	1	.5-2
	8-18	10-18	1.30-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low----------	0.24		
	18-20	---	---	---	---	---	-------------	----		
24--------------- Nauvoo	0-6	10-20	---	2.0-6.0	0.13-0.17	4.5-5.5	Low----------	0.28	3	.5-2
	6-32	18-35	---	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.32		
	32-50	15-30	---	0.6-2.0	0.11-0.17	4.5-5.5	Low----------	0.32		
	50-72	---	---	---	---	---	-------------	----		
25--------------- Nugent	0-8	3-10	1.20-1.40	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.17	5	.5-2
	8-72	2-10	1.20-1.40	2.0-6.0	0.05-0.10	4.5-6.5	Low----------	0.17		
26--------------- Oaklimeter	0-6	10-16	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	5	2-4
	6-33	7-18	1.40-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.43		
	33-72	7-30	1.40-1.50	0.6-2.0	0.20-0.20	4.5-5.5	Low----------	0.43		
27--------------- Rexor	0-7	15-26	1.30-1.55	0.6-2.0	0.15-0.24	4.5-6.0	Low----------	0.37	5	2-4
	7-46	18-35	1.35-1.65	0.6-2.0	0.15-0.24	4.5-6.0	Moderate-----	0.37		
	46-72	18-27	1.40-1.65	0.6-2.0	0.15-0.24	4.5-6.0	Low----------	0.37		
28--------------- Robinsonville	0-6	2-10	1.40-1.50	2.0-6.0	0.15-0.22	6.1-8.4	Low----------	0.32	5	.5-2
	6-72	5-15	1.50-1.60	0.6-6.0	0.14-0.18	6.1-8.4	Low----------	0.32		
29, 30----------- Sidon	0-6	8-25	1.20-1.40	0.6-2.0	0.13-0.24	3.6-5.5	Low----------	0.43	3	.5-2
	6-25	18-35	1.20-1.40	0.6-2.0	0.15-0.24	3.6-5.5	Low----------	0.43		
	25-41	18-40	1.40-1.60	0.06-0.6	0.08-0.15	3.6-5.5	Low----------	0.37		
	41-53	18-35	1.30-1.60	0.06-0.6	0.12-0.20	3.6-5.5	Low----------	0.32		
	53-55	---	---	---	---	---	-------------	----		
31--------------- Spadra	0-10	10-26	1.30-1.60	0.6-2.0	0.11-0.24	4.5-6.0	Low----------	0.37	5	.5-2
	10-41	18-32	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.37		
	41-72	15-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.24		
32*:										
Steprock---------	0-9	8-18	1.30-1.60	2.0-6.0	0.10-0.20	4.5-5.5	Low----------	0.24	3	.5-2
	9-28	10-35	1.30-1.60	0.6-2.0	0.06-0.10	4.5-5.5	Low----------	0.17		
	28-48	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
32*:										
Enders----------	0-8	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low----------	0.32	3	2-4
	8-12	15-35	1.25-1.60	0.2-0.6	0.15-0.22	3.6-5.5	Low----------	0.43		
	12-34	35-60	1.15-1.45	<0.06	0.12-0.18	3.6-5.5	High---------	0.37		
	34-41	35-60	1.20-1.45	<0.06	0.08-0.10	3.6-5.5	Moderate-----	0.37		
	41-46	---	---	---	---	---	-------------	----		
33*:										
Steprock--------	0-6	8-18	1.30-1.60	2.0-6.0	0.08-0.15	4.5-5.5	Low----------	0.20	3	.5-2
	6-28	10-35	1.30-1.60	0.6-2.0	0.06-0.10	4.5-5.5	Low----------	0.17		
	28-48	---	---	---	---	---	-------------	----		
Linker----------	0-12	5-20	1.30-1.60	0.6-2.0	0.11-0.17	3.6-5.5	Low----------	0.24	3	.5-2
	12-20	18-35	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.32		
	20-34	18-35	1.30-1.60	0.6-2.0	0.08-0.20	3.6-5.5	Low----------	0.28		
	34-36	---	---	---	---	---	-------------	----		
34*:										
Steprock--------	0-6	8-18	1.30-1.60	2.0-6.0	0.08-0.15	4.5-5.5	Low----------	0.20	3	.5-2
	6-28	10-35	1.30-1.60	0.6-2.0	0.06-0.10	4.5-5.5	Low----------	0.17		
	28-48	---	---	---	---	---	-------------	----		
Mountainburg----	0-6	3-10	1.40-1.60	2.0-6.0	0.05-0.10	5.1-6.0	Low----------	0.20	1	.5-2
	6-19	15-25	1.50-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Low----------	0.17		
	19-21	---	---	---	---	---	-------------	----		
35--------------- Taft	0-6	10-25	1.30-1.40	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	3	.5-2
	6-20	18-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.43		
	20-72	15-35	1.50-1.65	0.06-0.2	0.03-0.07	4.5-5.5	Low----------	0.43		
36--------------- Tichnor	0-22	18-25	1.25-1.50	0.6-2.0	0.16-0.24	4.5-6.0	Low----------	0.43	5	.5-2
	22-72	22-35	1.25-1.50	0.06-0.2	0.16-0.24	4.5-6.0	Moderate-----	0.37		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
1----------------- Allen	B	None---------	---	---	>6.0	---	---	>60	---	Low--------	Moderate.
2----------------- Barling	C	Occasional	Very brief to brief.	Dec-Apr	1.0-4.0	Perched	Dec-Apr	>60	---	Moderate	Moderate.
3----------------- Bonn	D	None---------	---	---	0-2.0	Perched	Dec-Apr	>60	---	High------	Low.
4----------------- Calhoun	D	None---------	---	---	0-2.0	Perched	Dec-Apr	>60	---	High------	Moderate.
5----------------- Calloway	C	None---------	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High------	Moderate.
6----------------- Commerce	C	Frequent----	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	>60	---	High------	Low.
7----------------- Crowley	D	None---------	---	---	0.5-1.5	Perched	Dec-Apr	>60	---	High------	Moderate.
8, 9, 10---------- Enders	C	None---------	---	---	>6.0	---	---	40-60	Soft	High------	High.
11*:											
Enders-----------	C	None---------	---	---	>6.0	---	---	40-60	Soft	High------	High.
Steprock---------	B	None---------	---	---	>6.0	---	---	20-40	Soft	Low--------	High.
12----------------- Gore	D	None---------	---	---	>6.0	---	---	>60	---	High------	Low.
13----------------- Guthrie	D	Rare---------	---	---	0.5-1.0	Perched	Jan-Apr	>60	---	High------	High.
14, 15------------ Jackport	D	None---------	---	---	0-1.0	Perched	Dec-Apr	>60	---	High------	High.
16----------------- Kobel	D	Frequent----	Brief to long.	Oct-May	0-1.0	Perched	Dec-Apr	>60	---	High------	Moderate.
17, 18------------ Leadvale	C	None---------	---	---	2.0-3.0	Perched	Jan-Apr	>48	Soft	Moderate	Moderate.
19, 20------------ Linker	B	None---------	---	---	>6.0	---	---	20-40	Hard	Low--------	High.
21, 22------------ Loring	C	None---------	---	---	2.0-3.0	Perched	Dec-Mar	>60	---	Moderate	Moderate.
23----------------- Mountainburg	D	None---------	---	---	>6.0	---	---	12-20	Hard	Low--------	Moderate.
24----------------- Nauvoo	B	None---------	---	---	>6.0	---	---	40-60	Soft	Low--------	High.
25----------------- Nugent	A	Occasional	Brief------	Dec-Apr	3.5-6.0	Apparent	Jan-Apr	>60	---	Low--------	Moderate.
26----------------- Oaklimeter	C	Frequent----	Brief to long.	Nov-Apr	1.5-2.5	Apparent	Nov-Mar	>60	---	Moderate	High.
27----------------- Rexor	A	Occasional	Very brief	Nov-Jun	4.0-5.0	Perched	Nov-May	>60	---	Moderate	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard- ness	Uncoated steel	Concrete
					Ft			In			
28: Robinsonville	B	Frequent	Brief to long.	Jan-Apr	4.0-6.0	Apparent	Jan-Apr	>60	---	Low	Low.
29, 30: Sidon	C	None	---	---	2.0-3.0	Perched	Jan-Apr	40-72	Hard	Moderate	Moderate.
31: Spadra	B	Occasional	Very brief to brief.	Dec-Apr	>6.0	---	---	>60	---	Low	High.
32*:											
Steprock	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Enders	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
33*:											
Steprock	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Linker	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
34*:											
Steprock	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Mountainburg	D	None	---	---	>6.0	---	---	12-20	Hard	Low	High.
35: Taft	C	None	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High	High.
36: Tichnor	D	Frequent	Long	Dec-May	0-1.0	Perched	Dec-May	>60	---	High	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil and sample number	Depth	Horizon	Particle-size distribution (less than 2.0 mm): Very coarse sand to medium sand (2.0-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In		Pct	Pct	Pct	Pct	Pct	Pct
Sidon loam:								
S77-AR-145-1-1	0-6	Ap	12	25	2	39	47	14
S77-AR-145-1-2	6-13	B21t	6	15	1	22	47	31
S77-AR-145-1-3	13-25	B22t	6	17	2	25	45	30
S77-AR-145-1-4	25-41	Bx	8	23	2	33	31	36
S77-AR-145-1-5	41-53	B3t	12	10	3	25	43	32
Sidon silt loam:								
S78-AR-145-8-1	0-6	Ap	5	16	6	27	62	11
S78-AR-145-8-2	6-15	B21t	5	12	4	21	58	21
S78-AR-145-8-3	15-27	B22t	8	12	4	24	53	23
S78-AR-145-8-4	27-41	Bx	7	13	4	24	51	25
Steprock very flaggy loam:								
S79-AR-145-1-1	1-3	A21	7	30	13	50	42	8
S79-AR-145-1-2	3-9	A22	6	29	9	44	50	6
S79-AR-145-1-3	9-16	B1	5	25	11	41	43	16
S79-AR-145-1-4	16-24	B21t	7	27	10	44	40	16
S79-AR-145-1-5	24-28	B22t	9	31	11	51	33	16

TABLE 17.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Extractable acidity	Base saturation	Reaction 1:1 soil:water	Organic matter
	In		Milliequivalents per 100-grams of soil					Pct	pH	Pct
Sidon loam:										
S77-AR-145-1-1	0-6	Ap	4.0	0.3	0.0	0.2	5.1	47	5.5	1.3
S77-AR-145-1-2	6-13	B21t	2.2	0.6	0.0	0.2	13.1	19	4.6	0.5
S77-AR-145-1-3	13-25	B22t	1.0	1.4	0.1	0.2	14.0	16	3.9	0.4
S77-AR-145-1-4	25-41	Bx	0.3	1.6	0.1	0.2	15.8	12	4.2	0.3
S77-AR-145-1-5	41-53	B3t	0.2	1.3	0.1	0.2	14.7	11	4.2	0.2
Sidon silt loam:										
S78-AR-145-8-1	0-6	Ap	7.7	0.7	0.0	0.4	4.6	66	6.4	2.2
S78-AR-145-8-2	6-15	B21t	1.1	1.1	0.1	0.2	11.6	18	4.2	0.7
S78-AR-145-8-3	15-27	B22t	0.8	1.7	0.1	0.2	13.0	18	4.2	0.5
S78-AR-145-8-4	27-41	Bx	0.5	1.5	0.1	0.1	13.8	14	4.2	0.3
Steprock very flaggy loam:										
S79-AR-145-1-1	1-3	A21	0.6	0.2	0.0	0.1	8.4	10	5.1	1.9
S79-AR-145-1-2	3-9	A22	0.2	0.1	0.0	0.1	8.5	5	5.1	0.9
S79-AR-145-1-3	9-16	B1	0.3	0.2	0.0	0.1	7.0	8	4.9	0.7
S79-AR-145-1-4	16-24	B21t	0.4	1.2	0.0	0.2	10.4	15	4.7	0.4
S79-AR-145-1-5	24-28	B22t	0.3	1.3	0.0	0.2	11.7	13	4.9	0.3

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Barling	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Bonn	Fine-silty, mixed, thermic Glossic Natraqualfs
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Crowley	Fine, montmorillonitic, thermic Typic Albaqualfs
Enders	Clayey, mixed, thermic Typic Hapludults
Gore	Fine, mixed, thermic Vertic Paleudalfs
Guthrie	Fine-silty, siliceous, thermic Typic Fragiaquults
Jackport	Very-fine, montmorillonitic, thermic Vertic Ochraqualfs
Kobel	Fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Leadvale	Fine-silty, siliceous, thermic Typic Fragiudults
Linker	Fine-loamy, siliceous, thermic Typic Hapludults
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Mountainburg	Loamy-skeletal, siliceous, thermic Lithic Hapludults
Nauvoo	Fine-loamy, siliceous, thermic Typic Hapludults
Nugent	Sandy, siliceous, thermic Typic Udifluvents
Oaklimeter	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Rexor	Fine-silty, siliceous, thermic Ultic Hapludalfs
Robinsonville	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Sidon	Fine-loamy, siliceous, thermic Typic Fragiudults
Spadra	Fine-loamy, siliceous, thermic Typic Hapludults
Steprock	Loamy-skeletal, siliceous, thermic Typic Hapludults
Taft	Fine-silty, siliceous, thermic Glossaquic Fragiudults
Tichnor	Fine-silty, mixed, thermic Typic Ochraqualfs

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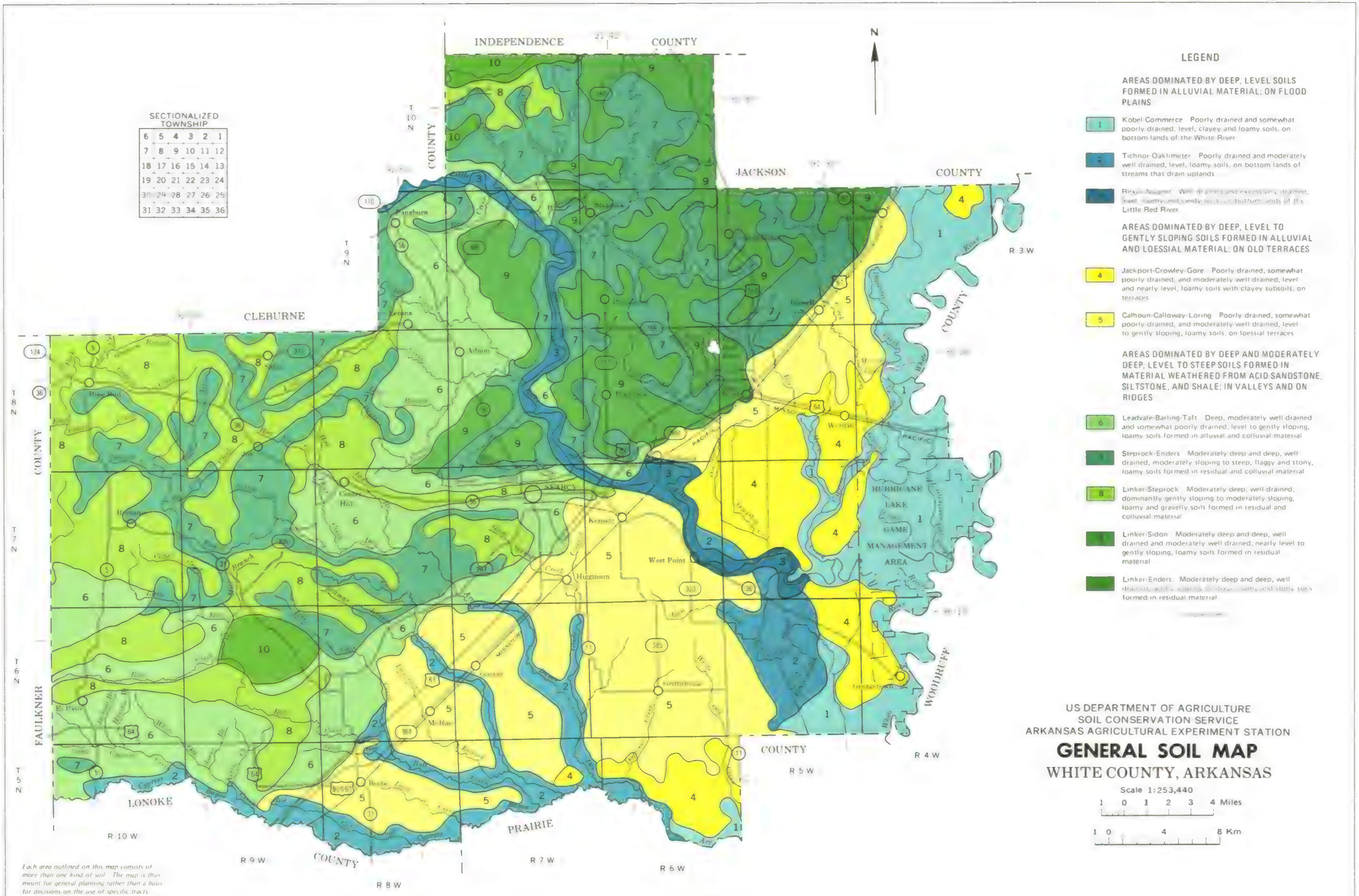
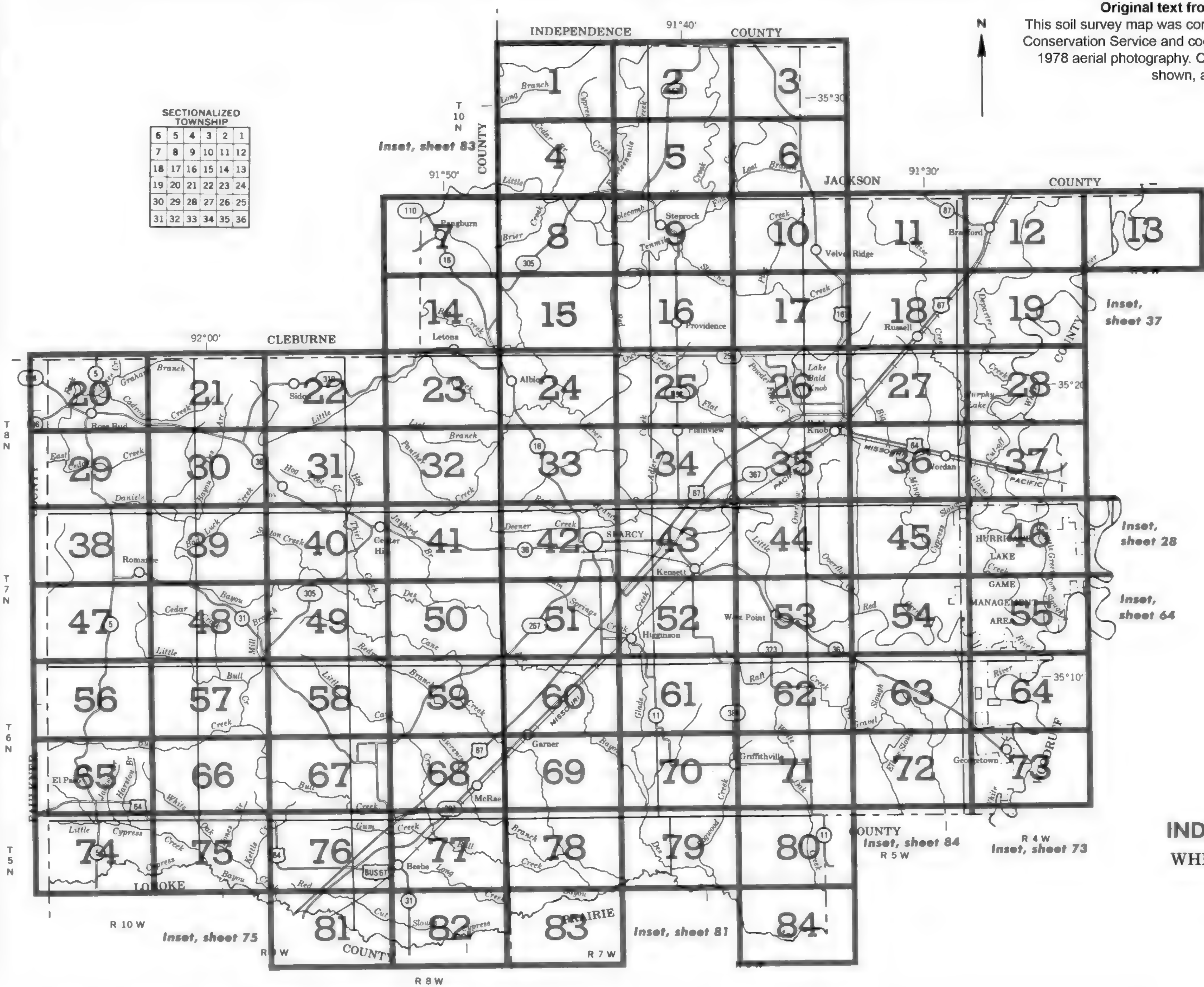

INDEPENDENCE COUNTY
JACKSON COUNTY
CLEBURNE COUNTY
FAULKNER COUNTY
LONOKE
PRAIRIE COUNTY
WOODRUFF COUNTY
SECTIONALIZED TOWNSHIP
6 5 4 3 2 1
7 8 9 10 11 12
18 17 16 15 14 13
19 20 21 22 23 24
30 29 28 27 26 25
31 32 33 34 35 36
N
SEARCY
Kensett
West Point
Higginson
Pangburn
Letona
Albion
Rose Bud
Romance
Center Hill
El Paso
McRae
Beebe
Garner
Griffithville
Georgetown
HURRICANE LAKE GAME MANAGEMENT AREA
T 10 N
T 9 N
T 8 N
T 7 N
T 6 N
T 5 N
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
R 4 W
R 3 W
LEGEND
AREAS DOMINATED BY DEEP, LEVEL SOILS FORMED IN ALLUVIAL MATERIAL; ON FLOOD PLAINS
1 Kobel-Commerce Poorly drained and somewhat poorly drained, level, clayey and loamy soils, on bottom lands of the White River
Tichnor-Oaklimeter Poorly drained and moderately well drained, level, loamy soils, on bottom lands of streams that drain uplands
Little Red River
AREAS DOMINATED BY DEEP, LEVEL TO GENTLY SLOPING SOILS FORMED IN ALLUVIAL AND LOESSIAL MATERIAL; ON OLD TERRACES
4 Jackport-Crowley-Gore Poorly drained, somewhat poorly drained, and moderately well drained, level and nearly level, loamy soils with clayey subsoils, on terraces
5 Calhoun-Calloway-Loring Poorly drained, somewhat poorly drained, and moderately well drained, level to gently sloping, loamy soils, on loessial terraces
AREAS DOMINATED BY DEEP AND MODERATELY DEEP, LEVEL TO STEEP SOILS FORMED IN MATERIAL WEATHERED FROM ACID SANDSTONE, SILTSTONE, AND SHALE; IN VALLEYS AND ON RIDGES
6 Leadvale-Barling-Taft Deep, moderately well drained and somewhat poorly drained, level to gently sloping, loamy soils formed in alluvial and colluvial material
Steprock-Enders Moderately deep and deep, well drained, moderately sloping to steep, flaggy and stony, loamy soils formed in residual and colluvial material
8 Linker-Steprock Moderately deep, well drained, dominantly gently sloping to moderately sloping, loamy and gravelly soils formed in residual and colluvial material
Linker-Sidon Moderately deep and deep, well drained and moderately well drained, nearly level to gently sloping, loamy soils formed in residual material
Linker-Enders: Moderately deep and deep, well
formed in residual material
US DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ARKANSAS AGRICULTURAL EXPERIMENT STATION
GENERAL SOIL MAP
WHITE COUNTY, ARKANSAS
Scale 1:253,440
1 0 1 2 3 4 Miles
1 0 4 8 Km
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Base maps are prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



INDEX TO MAP SHEETS

WHITE COUNTY, ARKANSAS

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

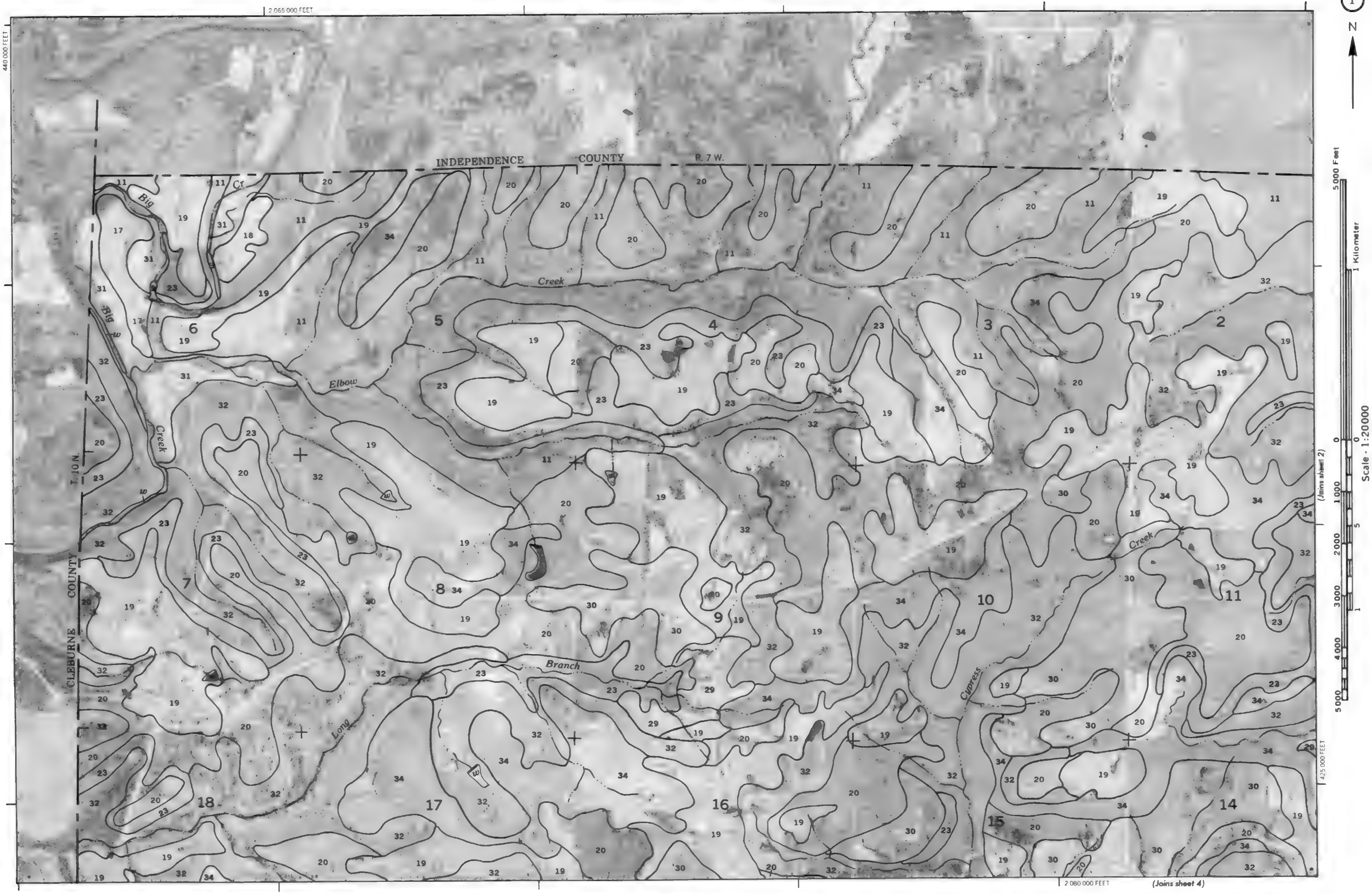
MISCELLANEOUS

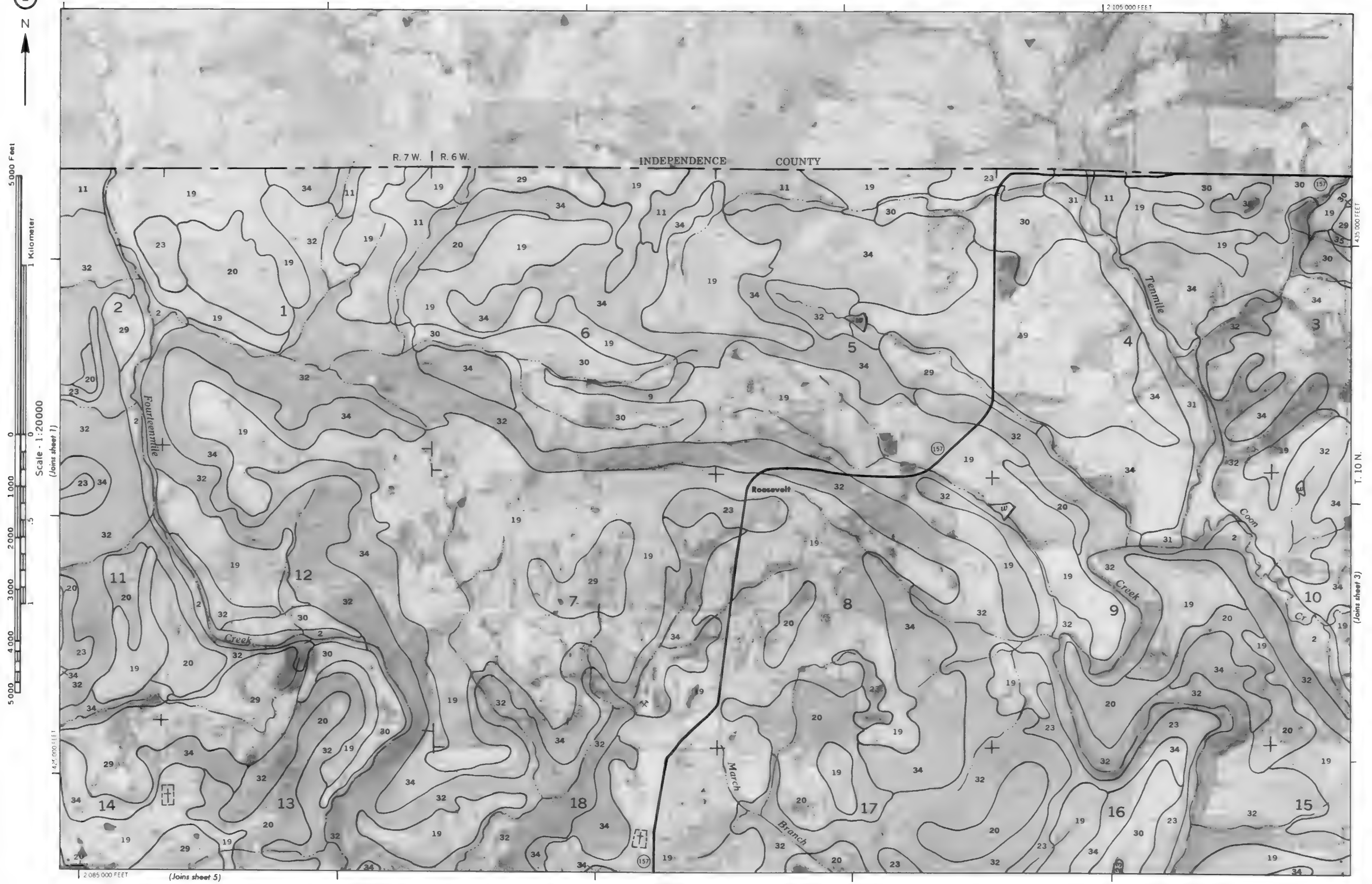
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

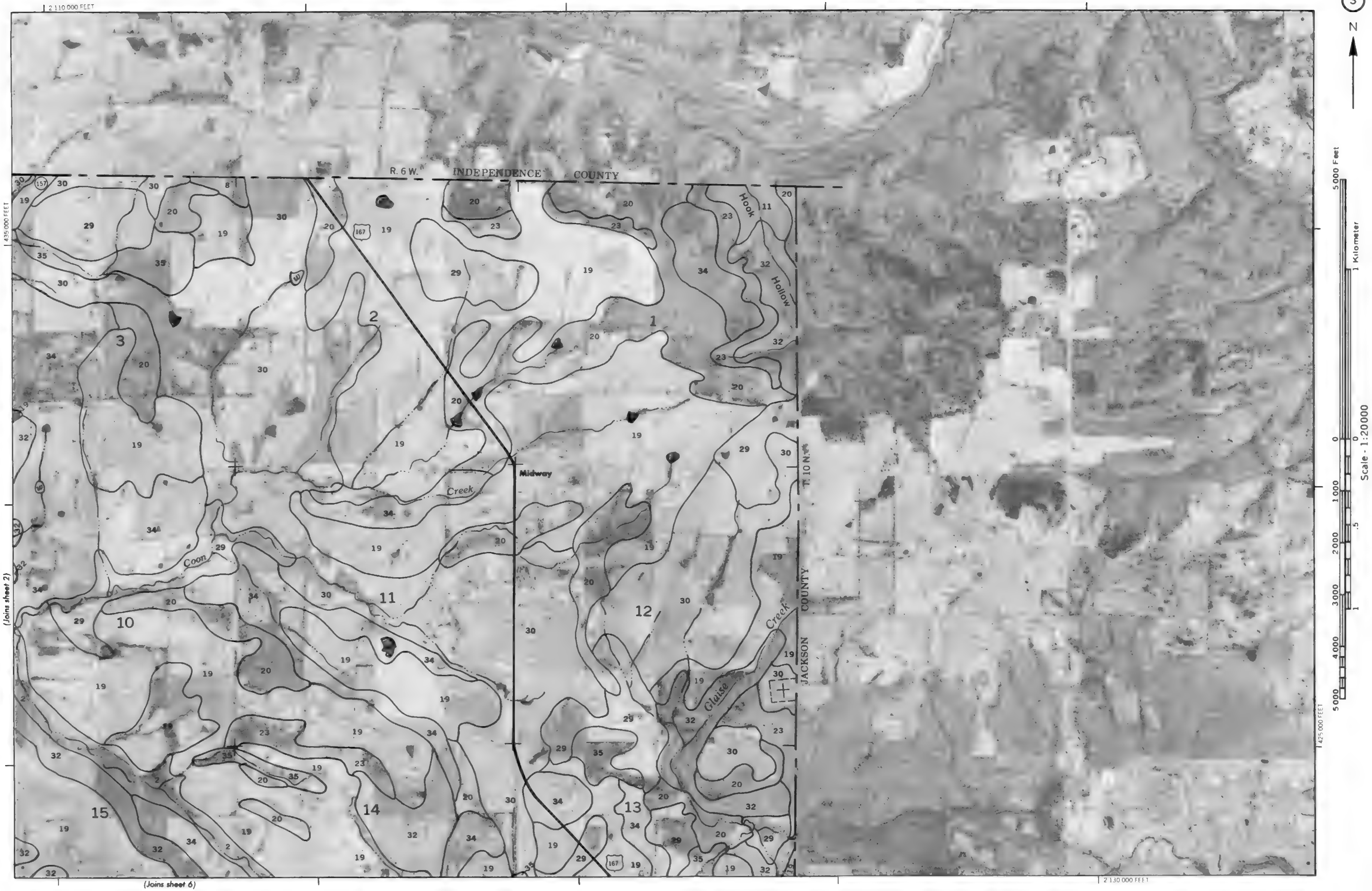
SOIL LEGEND

The legend is numeric. Soils without a slope designation in the name are those that are found only on nearly level landscapes of occasionally or frequently flooded bottom lands.

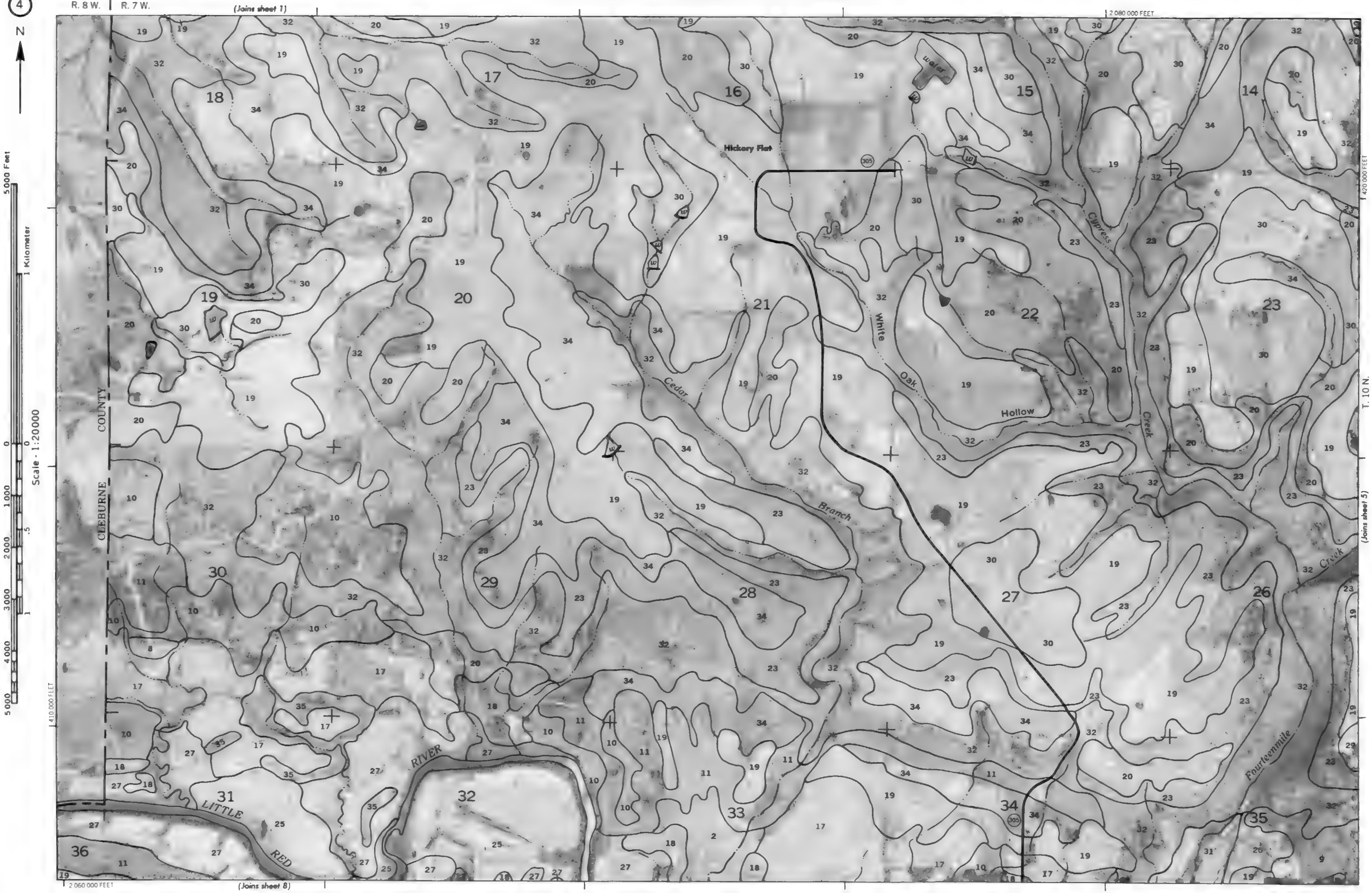
SYMBOL	NAME
1	Allen fine sandy loam, 3 to 8 percent slopes
2	Barling silt loam, occasionally flooded
3	Bonn silt loam, 0 to 1 percent slopes
4	Calhoun silt loam, 0 to 1 percent slopes
5	Calloway silt loam, 0 to 1 percent slopes
6	Commerce silty clay loam, frequently flooded
7	Crowley silt loam, 0 to 1 percent slopes
8	Enders fine sandy loam, 3 to 8 percent slopes
9	Enders gravelly fine sandy loam, 8 to 12 percent slopes
10	Enders stony fine sandy loam, 3 to 12 percent slopes
11	Enders-Steprock complex, 12 to 30 percent slopes
12	Gore silt loam, 1 to 3 percent slopes
13	Guthrie silt loam, 0 to 1 percent slopes
14	Jackport silty clay loam, 0 to 1 percent slopes
15	Jackport silty clay loam, gently undulating
16	Kobel silty clay, frequently flooded
17	Leadvale silt loam, 1 to 3 percent slopes
18	Leadvale silt loam, 3 to 8 percent slopes
19	Linker fine sandy loam, 3 to 8 percent slopes
20	Linker gravelly fine sandy loam, 3 to 8 percent slopes
21	Loring silt loam, 1 to 3 percent slopes
22	Loring silt loam, 3 to 8 percent slopes
23	Mountainburg stony fine sandy loam, 3 to 12 percent slopes
24	Nauvoo fine sandy loam, 3 to 8 percent slopes
25	Nugent loamy fine sand, occasionally flooded
26	Oaklimeter silt loam, frequently flooded
27	Rexor silt loam, occasionally flooded
28	Robinsonville fine sandy loam, frequently flooded
29	Sidon loam, 1 to 3 percent slopes
30	Sidon loam, 3 to 8 percent slopes
31	Spadra fine sandy loam, occasionally flooded
32	Steprock-Enders complex, 12 to 30 percent slopes
33	Steprock-Linker complex, 3 to 8 percent slopes
34	Steprock-Mountainburg complex, 8 to 12 percent slopes
35	Taft silt loam, 0 to 2 percent slopes
36	Tichnor silt loam, frequently flooded

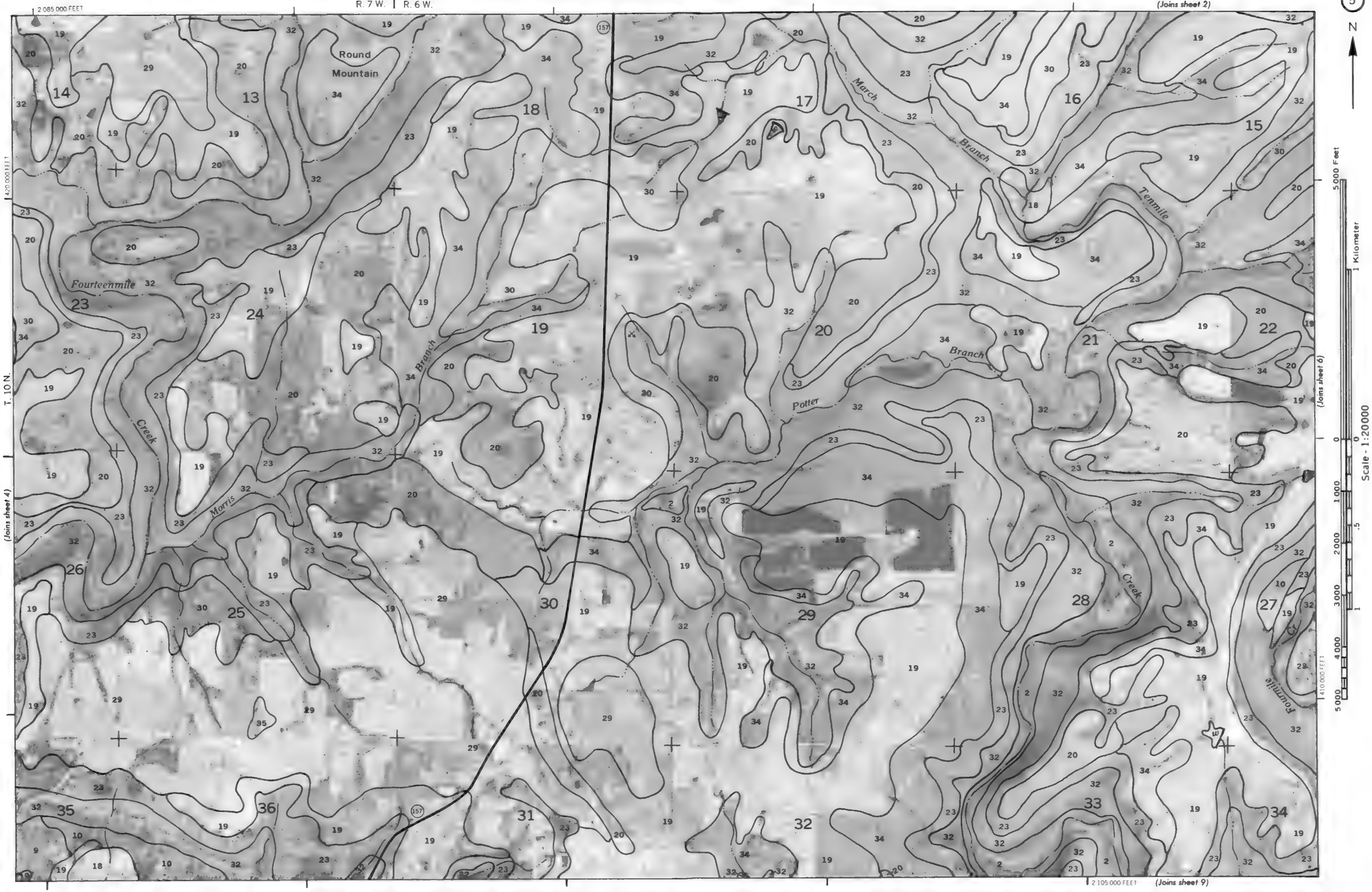

1
N
2 065 000 FEET
440 000 FEET
INDEPENDENCE COUNTY
R. 7 W.
T. 10 N.
CLEBURNE COUNTY
Big Creek
Elbow Creek
Long Branch
Cypress Creek
(Joins sheet 2)
(Joins sheet 4)
2 080 000 FEET
425 000 FEET
5 000 Feet
1 Kilometer
Scale - 1:20000

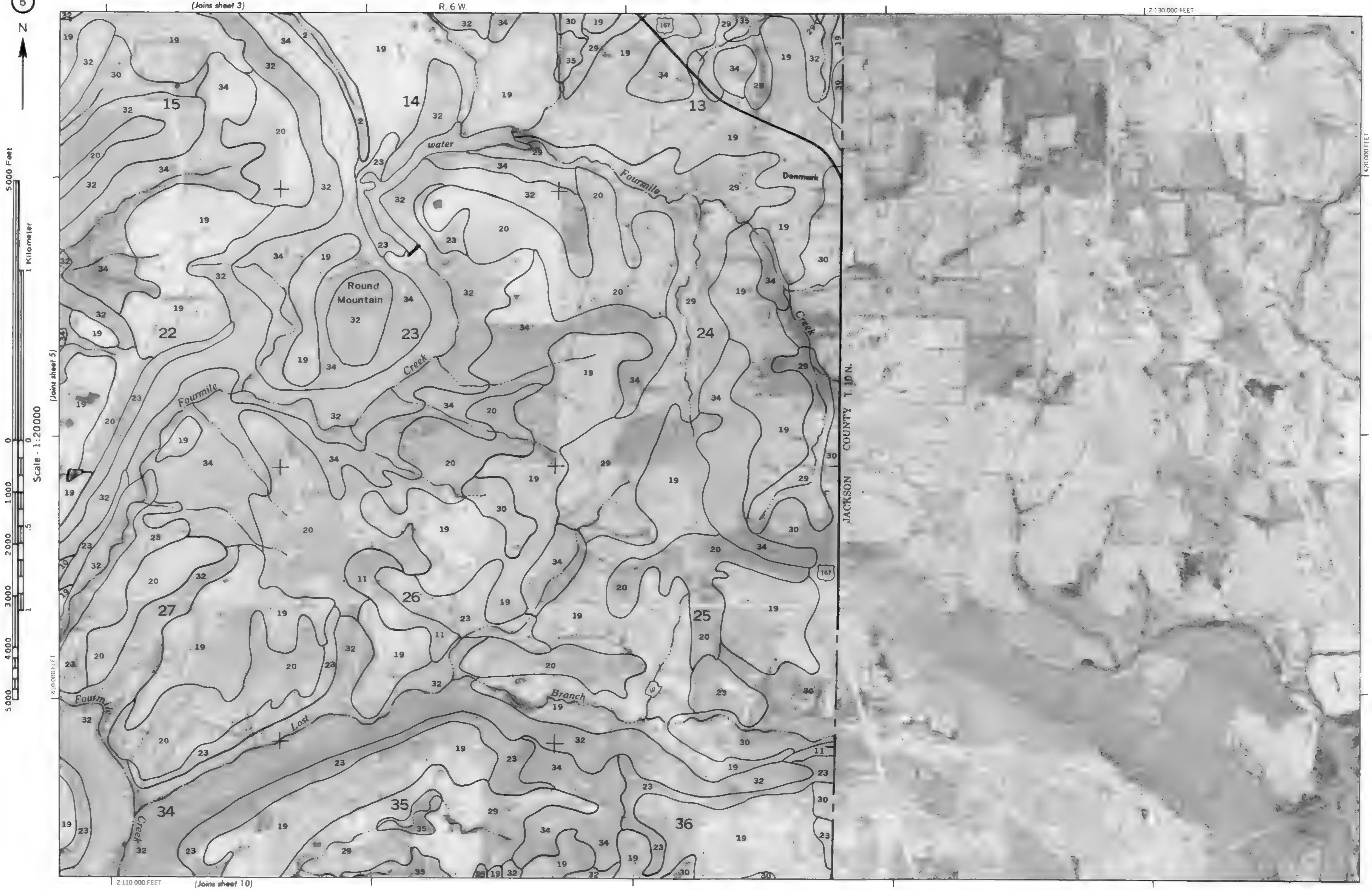

N
5 000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 5)
2 105 000 FEET
435 000 FEET
425 000 FEET
2 085 000 FEET
R. 7 W. | R. 6 W.
INDEPENDENCE COUNTY
T. 10 N.
Fourteenmile
Creek
Tenmile
Coon Creek
Coon Cr
Roosevelt
March Branch
157



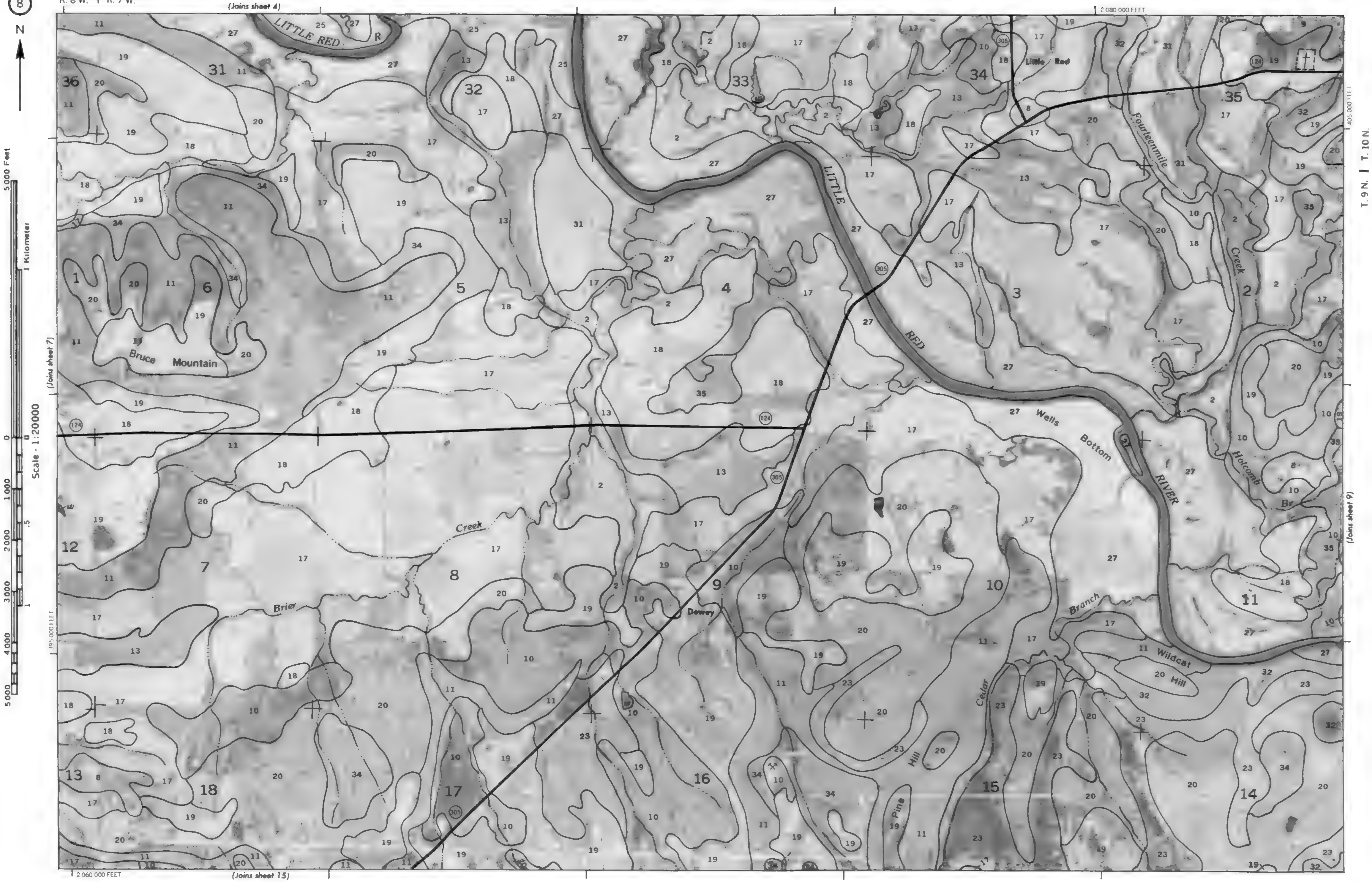
3
N
2 110 000 FEET
435 000 FEET
425 000 FEET
2 130 000 FEET
R. 6 W.
INDEPENDENCE COUNTY
JACKSON COUNTY
T. 10 N.
Hook Hollow
Midway
Creek
Coon
Gluise Creek
(Joins sheet 2)
(Joins sheet 6)
5 000 Feet
1 Kilometer
Scale 1:20000

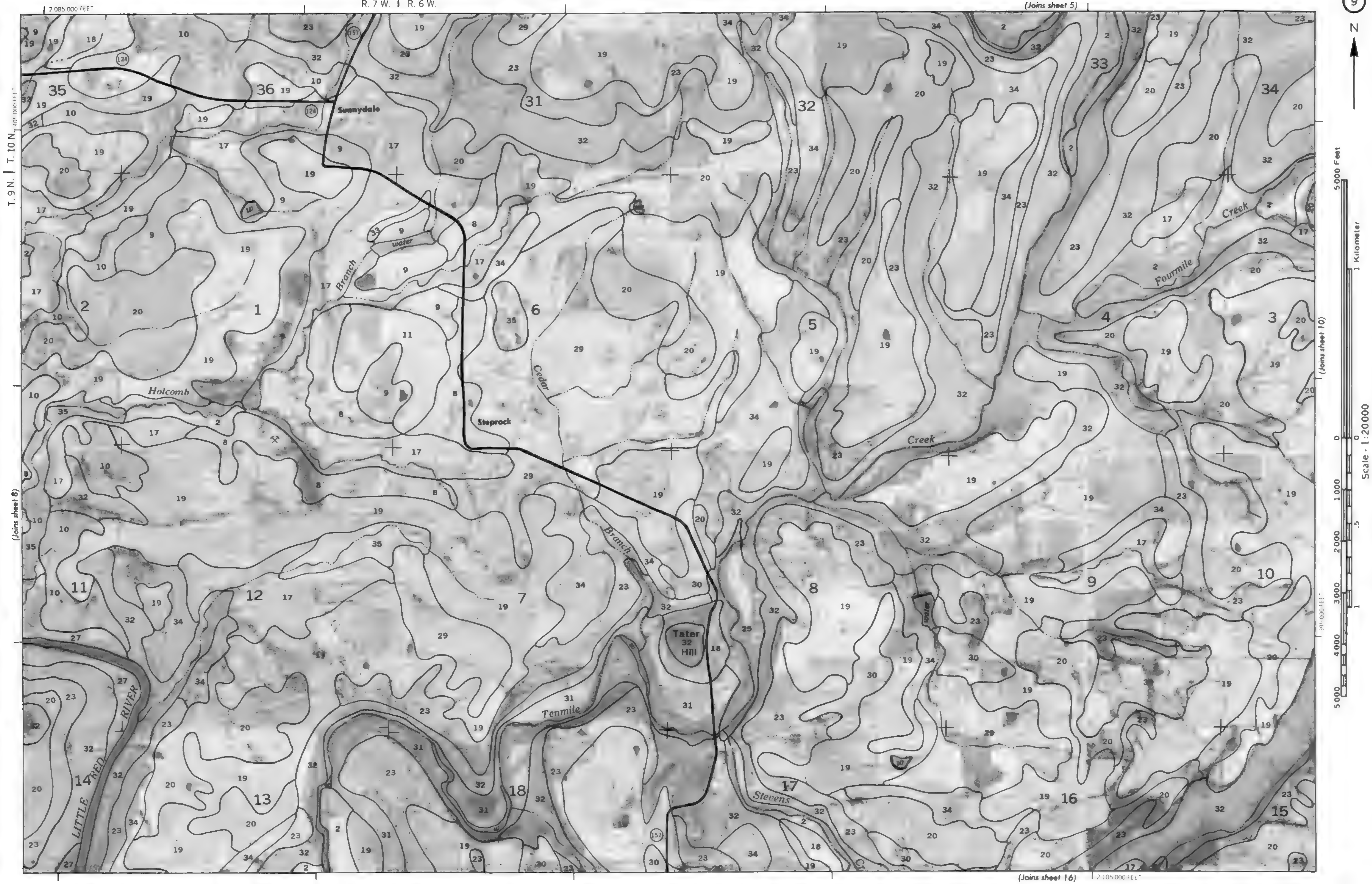

4
N
R. 8 W.
R. 7 W.
(Joins sheet 1)
2 080 000 FEET
Hickory Flat
water
White Oak Hollow
Cedar Branch
Cypress Creek
Fourteenmile Creek
LITTLE RED RIVER
CLEBURNE COUNTY
T. 10 N.
420 000 FEET
(Joins sheet 5)
410 000 FEET
2 060 000 FEET
(Joins sheet 8)
5000 Feet
1 Kilometer
Scale 1:20000


R. 7 W.
R. 6 W.
T. 10 N.
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 9)
2 085 000 FEET
2 105 000 FEET
420 000 FEET
410 000 FEET
Round Mountain
Fourteenmile
Creek
Morris
Branch
March Branch
Tenmile
Potter
Branch
Creek
Fourmile
157
5
N
5000 Feet
1 Kilometer
Scale - 1:20000

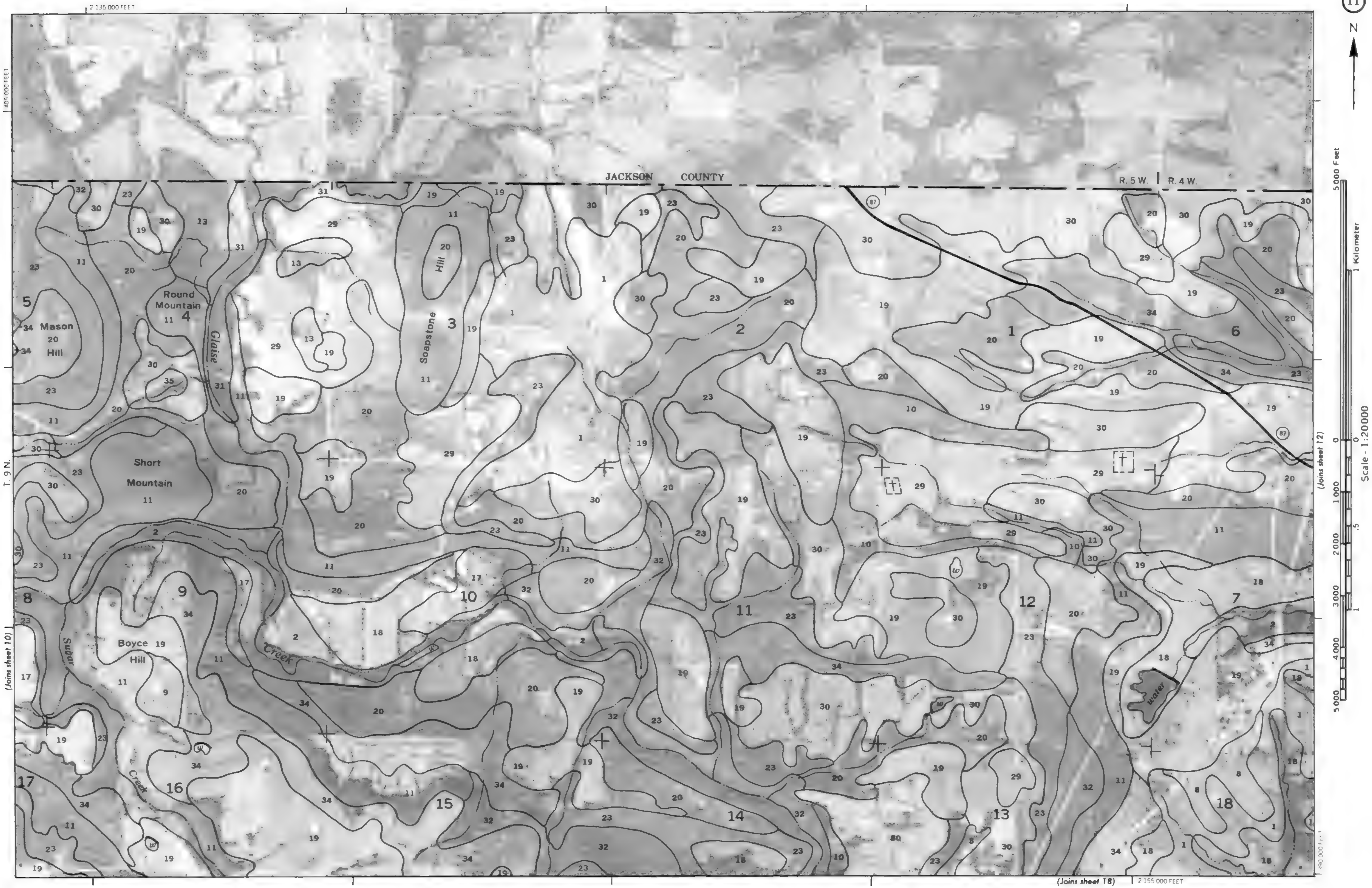

6
N
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1
(Joins sheet 3)
R. 6 W.
2 130 000 FEET
(Joins sheet 5)
(Joins sheet 10)
2 110 000 FEET
420 000 FEET
410 000 FEET
JACKSON COUNTY
T. 10 N.
Denmark
Round Mountain
Fourmile Creek
Lost Creek
Branch
water
167
15
14
13
22
23
24
27
26
25
34
35
36

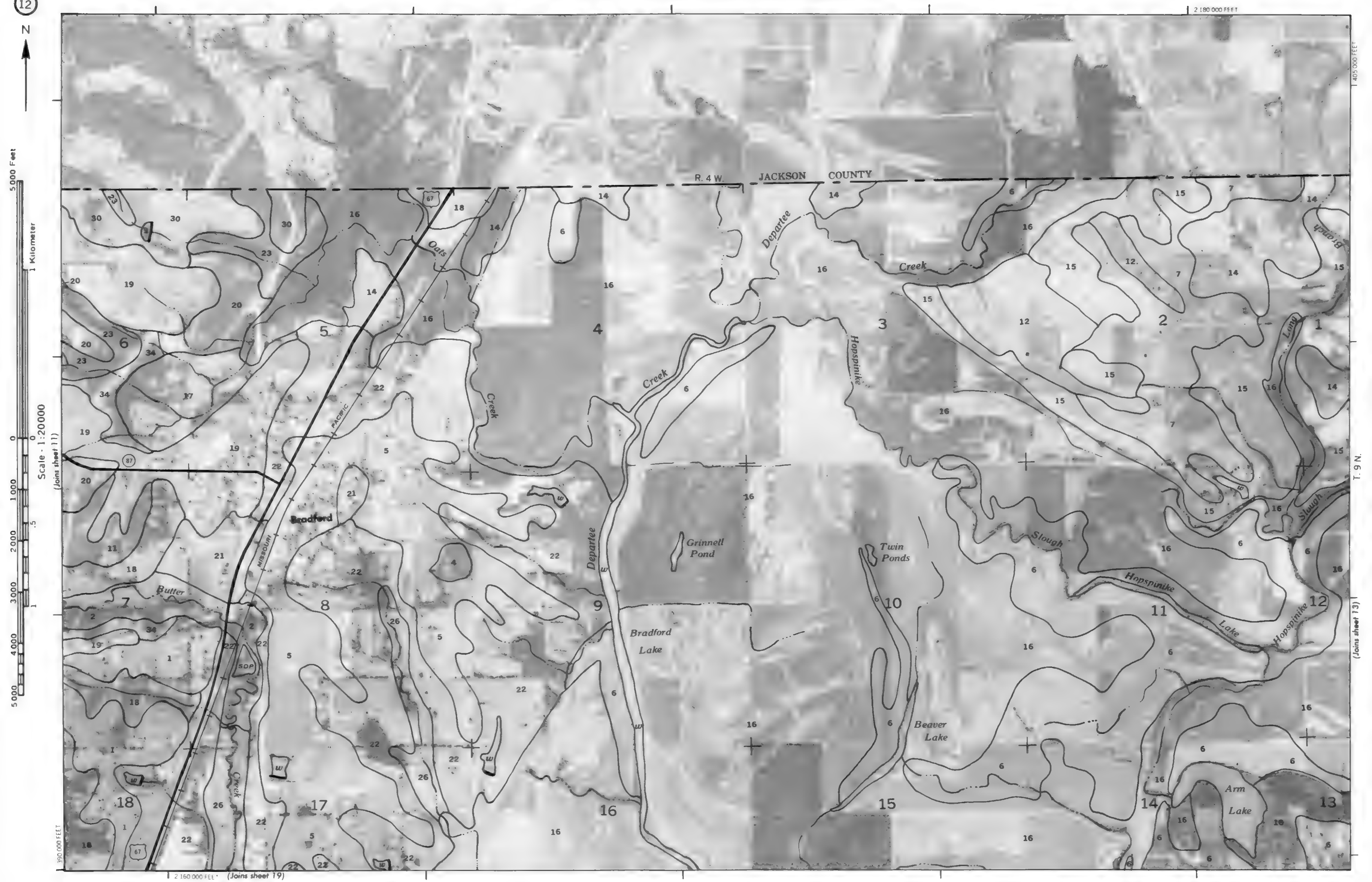

7
N
2 040 000 FEET
(Joins inset, sheet 83)
405 000 FEET
LITTLE RED RIVER
CLEBURNE COUNTY
R. 8 W.
T. 10 N.
T. 9 N.
Pangburn
Mount Zion
Brier Creek
Marsh Mountain
CLEBURNE COUNTY
(Joins sheet 8)
395 000 FEET
(Joins sheet 14)
2 060 000 FEET
5000 Feet
1 Kilometer
Scale 1:20000
0
1000
2000
3000
4000
5000
.5


8
N
R. 8 W.
R. 7 W.
(Joins sheet 4)
2 080 000 FEET
405 000 FEET
T. 10 N.
T. 9 N.
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 15)
2 060 000 FEET
395 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000
LITTLE RED
LITTLE
RED
RIVER
Little Red
Fourteenmile
Creek
Bruce
Mountain
Creek
Brier
Dewey
Wells
Bottom
Holcomb
Br.
Branch
Wildcat
Hill
Cedar
Hill
Pine
124
305

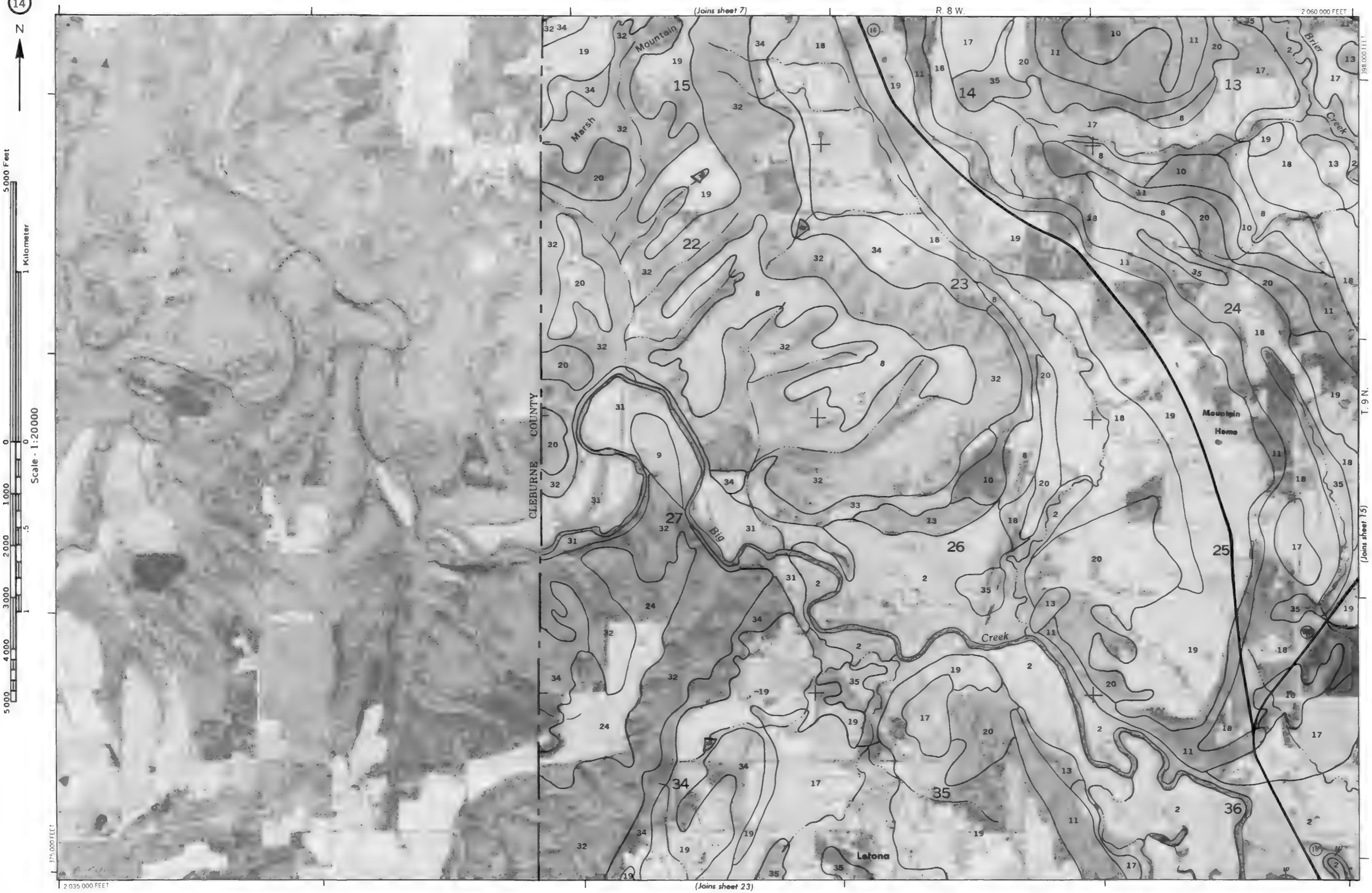

2 085 000 FEET
R. 7 W.
R. 6 W.
(Joins sheet 5)
T. 10 N.
T. 9 N.
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 16)
Sunnydale
Steprock
Tater Hill
Holcomb
Branch
Cedar
Creek
Fourmile
Tenmile
Stevens
LITTLE RED RIVER
water
N
5000 Feet
1 Kilometer
Scale - 1:20000

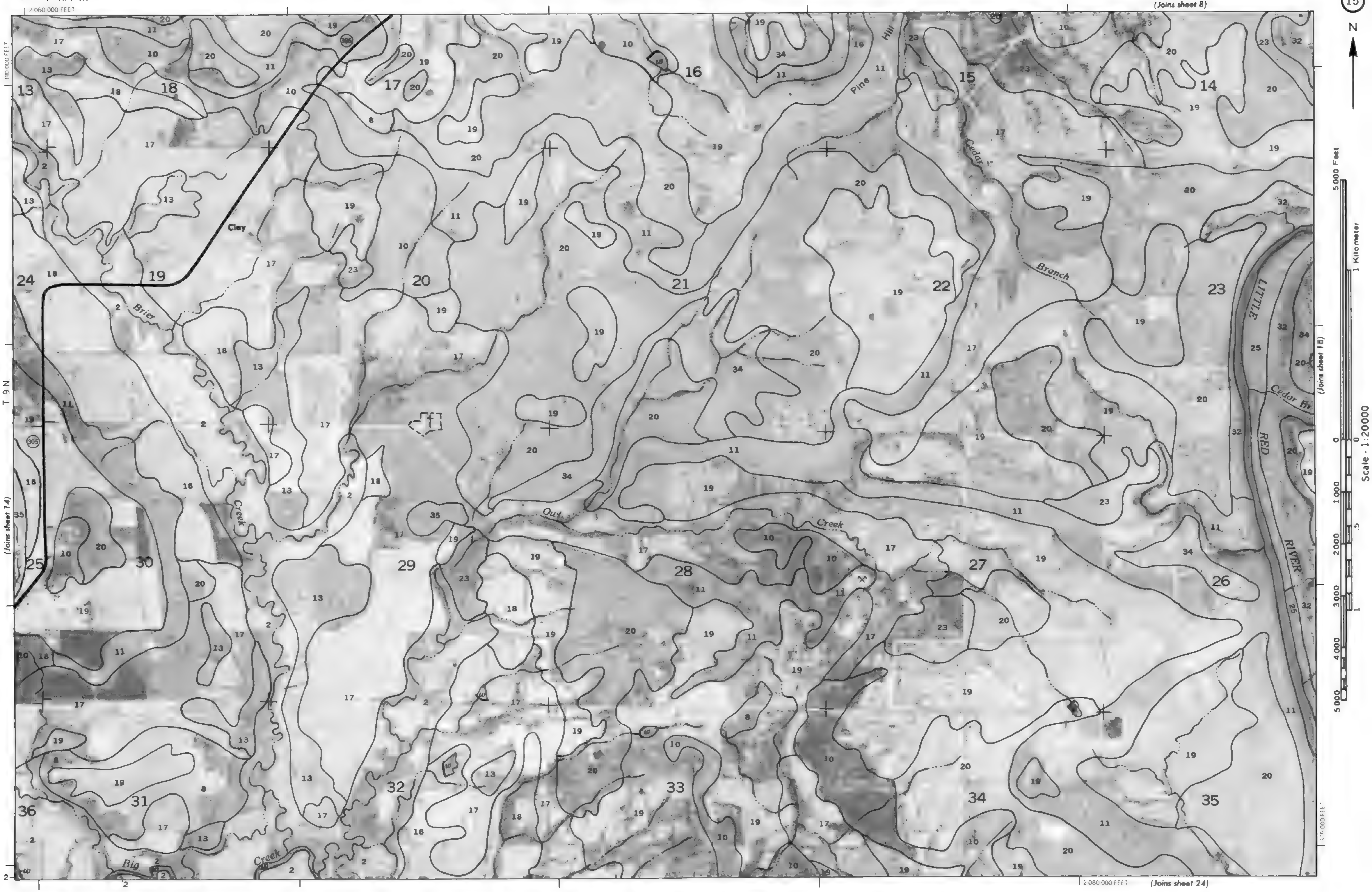

10
N
(Joins sheet 6)
R. 6 W.
R. 5 W.
2 130 000 FEET
405 000 FEET
T. 10 N.
T. 9 N.
JACKSON COUNTY
Flat Top Mountain
Fourmile
Creek
Pine Creek
Whippoorwill Branch
Mason Hill
Velvet Ridge
water
167
(Joins sheet 9)
(Joins sheet 11)
395 000 FEET
2 110 000 FEET
(Joins sheet 17)
5 000 Feet
1 Kilometer
Scale 1:20000
0
1 000
2000
3000
4000
5 000
.5

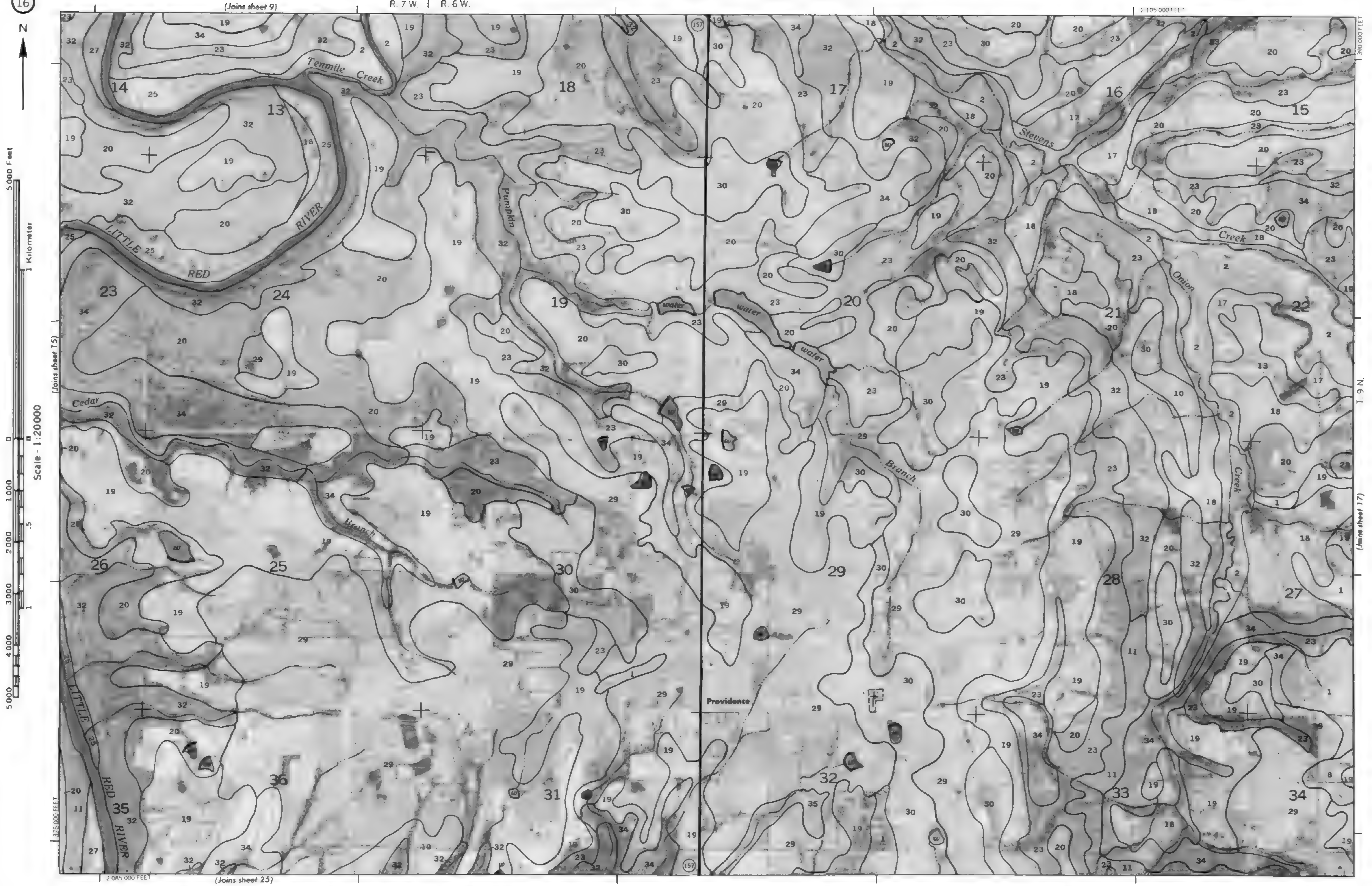

11
N
2 135 000 FEET
2 155 000 FEET
JACKSON COUNTY
R. 5 W.
R. 4 W.
T. 9 N.
87
Mason Hill
Round Mountain
Glaise
Soapstone Hill
Short Mountain
Boyce Hill
Sugar Creek
Creek
water
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 18)
5000 Feet
1 Kilometer
Scale - 1:20000

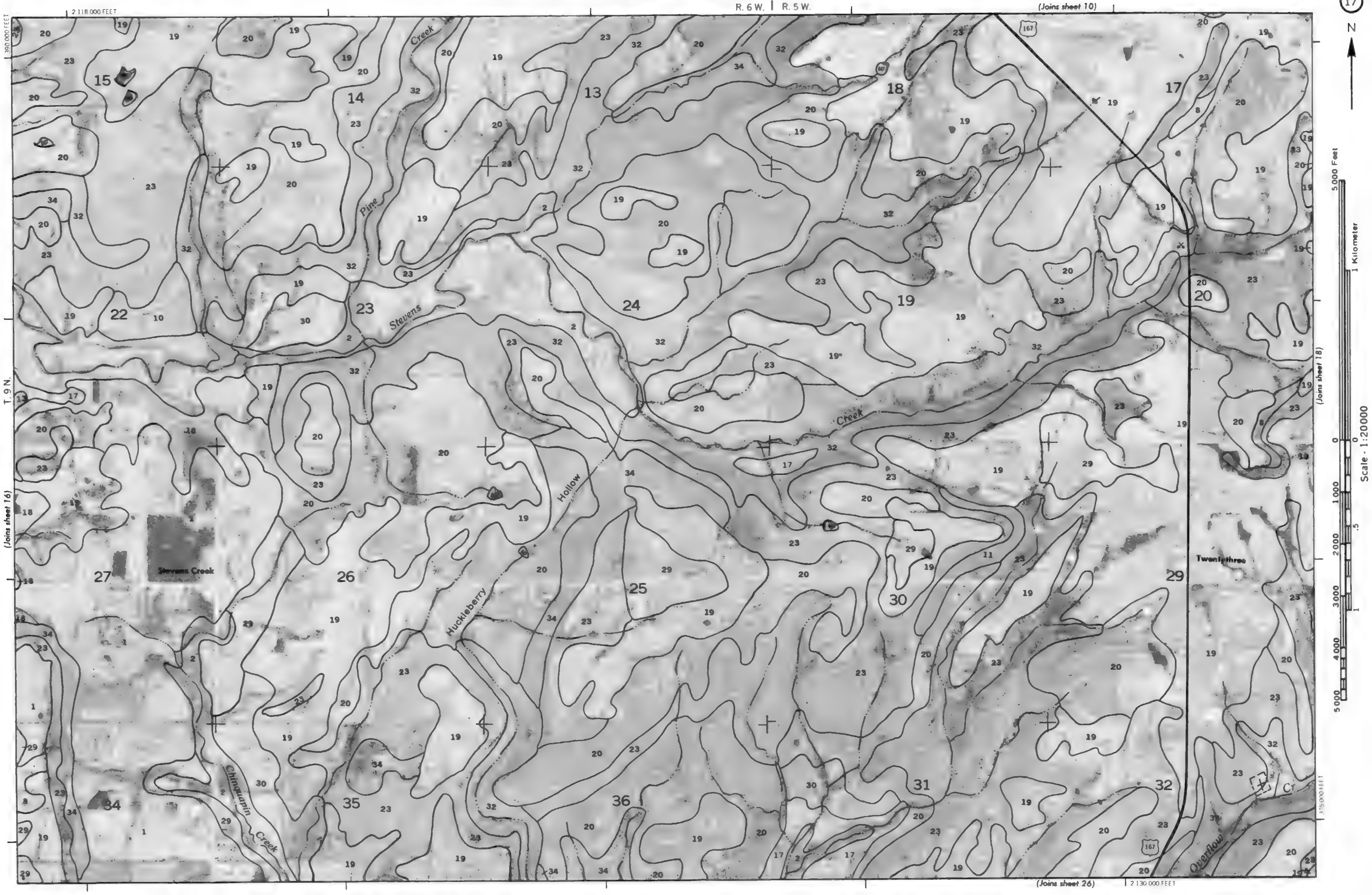

N
5 000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 19)
2 180 000 FEET
2 160 000 FEET
405 000 FEET
390 000 FEET
R. 4 W.
JACKSON COUNTY
T. 9 N.
Oats Creek
Departee Creek
Hopspinike
Hopspinike Slough
Hopspinike Lake
Long Branch
Slough
Butter
Creek
Bradford
MISSOURI PACIFIC
Grinnell Pond
Twin Ponds
Bradford Lake
Beaver Lake
Arm Lake

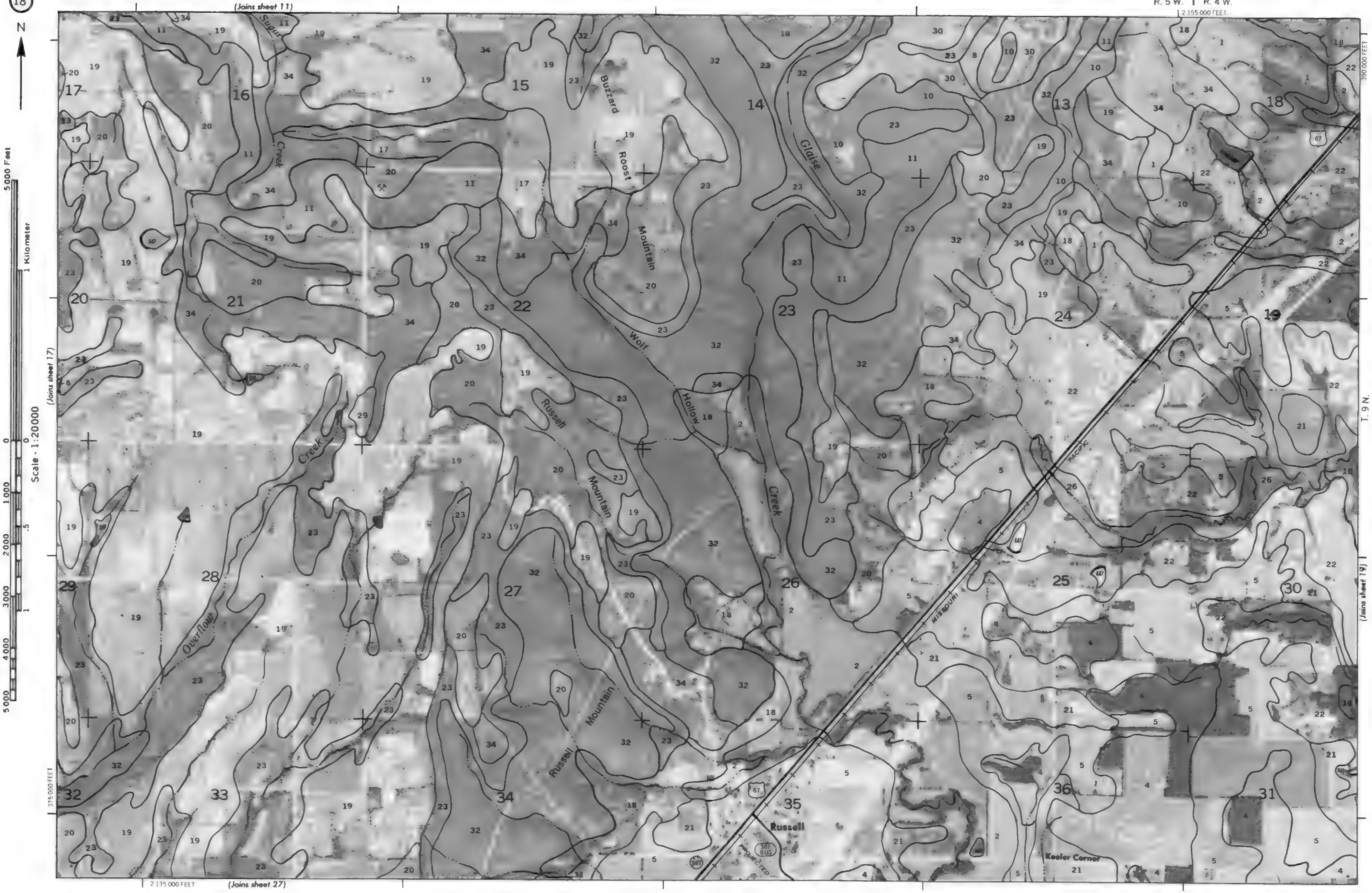
2 185 000 FEET
405 000 FEET
R. 4 W.
R. 3 W.
JACKSON COUNTY
RIDGE
TUCKER
Long Branch
Otto Lake
Slough
Hopspinike
RIVER
WHITE
WOODRUFF COUNTY
McDougal Lake
T 9 N.
(Joins sheet 12)
(Joins inset, sheet 37)
390 000 FEET
2 205 000 FEET
N
5000 Feet
1 Kilometer
Scale - 1:20000

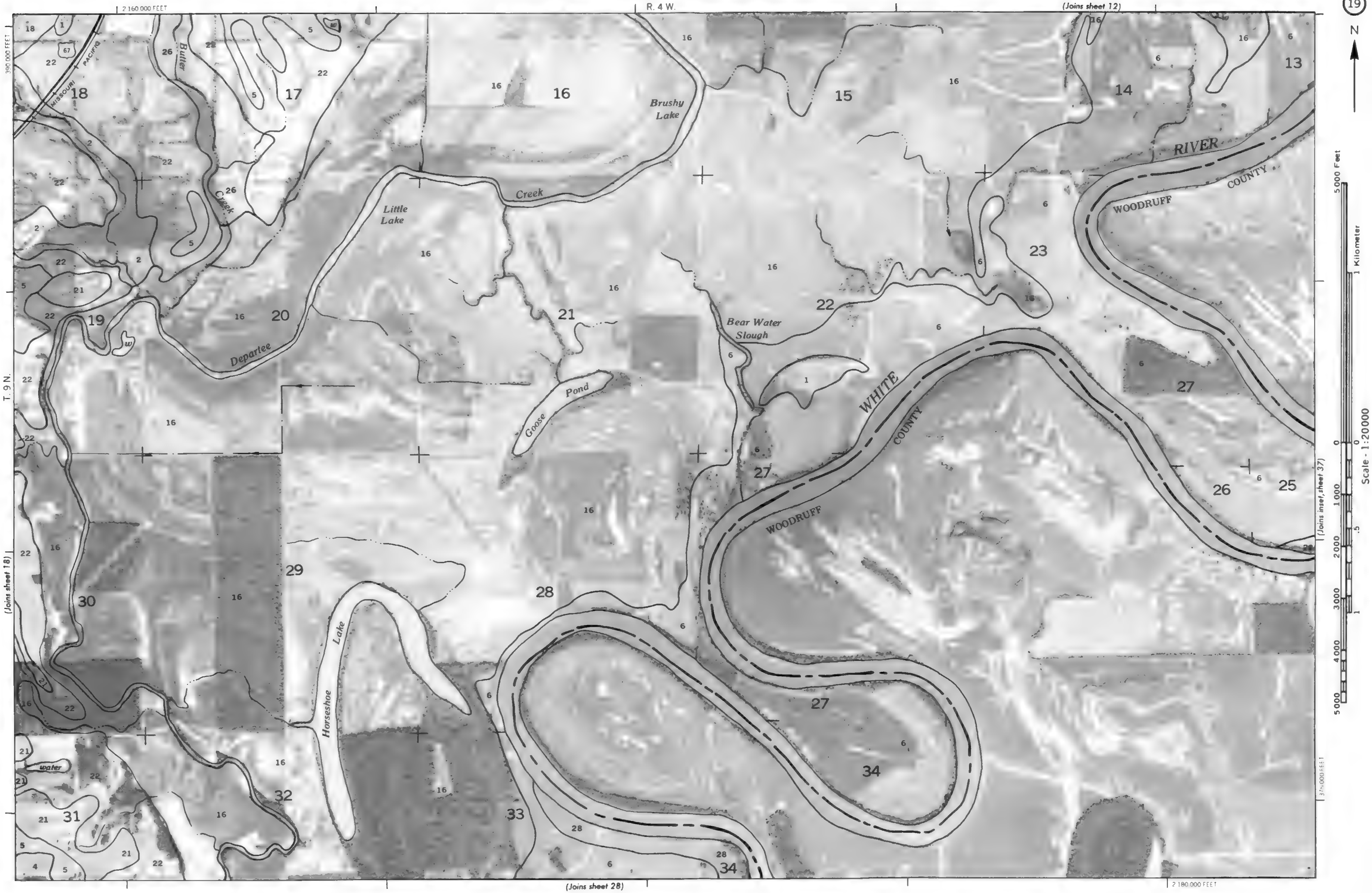

14
N
5 000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 7)
R. 8 W.
2 060 000 FEET
Marsh
Mountain
Brier
Creek
CLEBURNE COUNTY
Big
Creek
Mountain Home
T. 9 N.
(Joins sheet 15)
Letona
375 000 FEET
2 035 000 FEET
(Joins sheet 23)

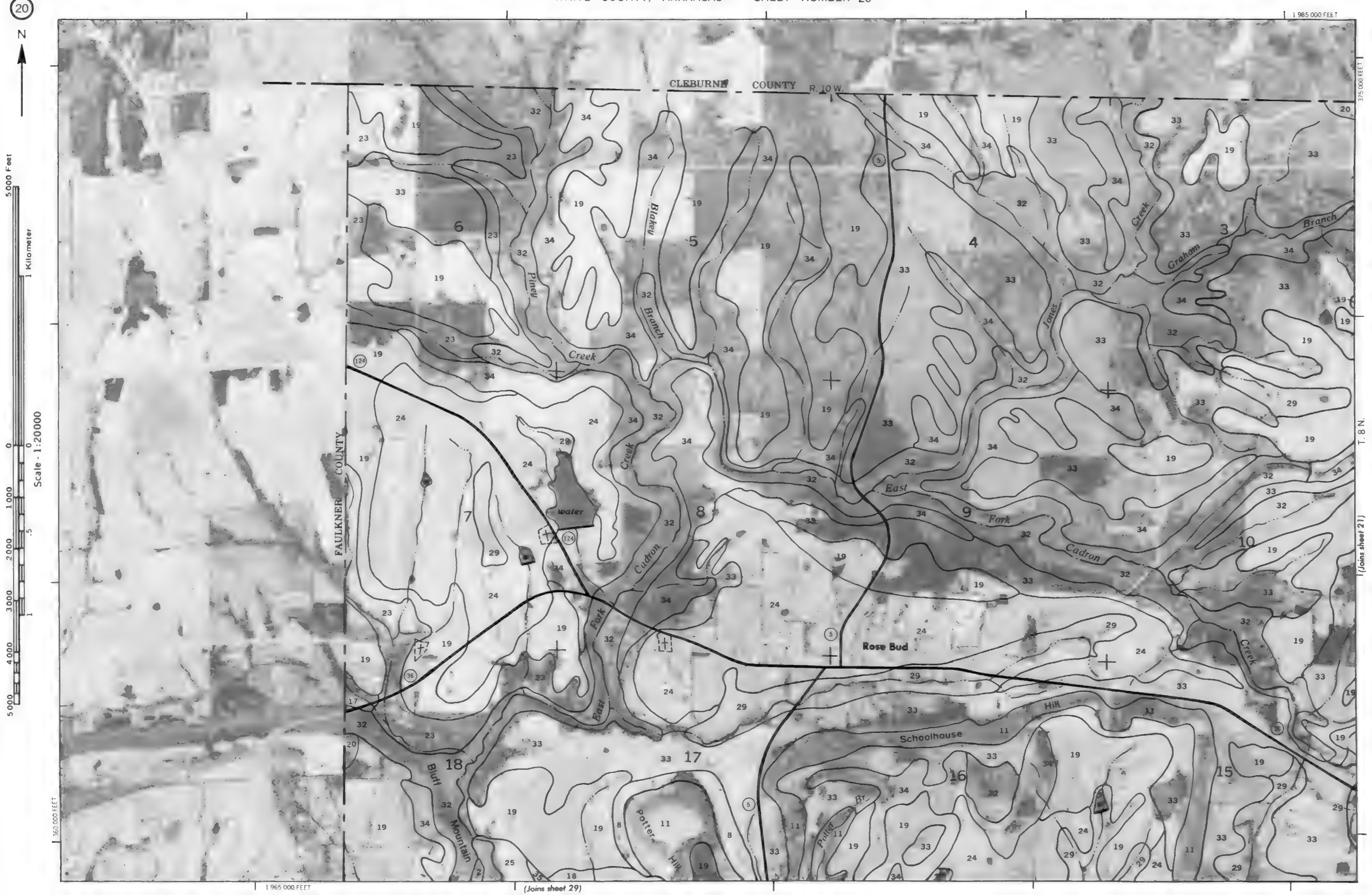

R. 8 W. | R. 7 W.
2 060 000 FEET
390 000 FEET
(Joins sheet 8)
15
N
T. 9 N.
(Joins sheet 14)
(Joins sheet 18)
(Joins sheet 24)
2 080 000 FEET
Clay
Brier Creek
Out Creek
Pine Hill
Cedar Branch
Cedar Br
LITTLE RED RIVER
Big Creek
305
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1


N
(Joins sheet 9)
R. 7 W.
R. 6 W.
2 105 000 FEET
390 000 FEET
Tenmile Creek
LITTLE RED RIVER
Pumpkin
Stevens
Creek
Onion
Creek
Cedar
Branch
Branch
water
Providence
157
T. 9 N.
(Joins sheet 15)
(Joins sheet 17)
375 000 FEET
2 085 000 FEET
(Joins sheet 25)
LITTLE RED RIVER
5 000 Feet
1 Kilometer
Scale - 1:20000

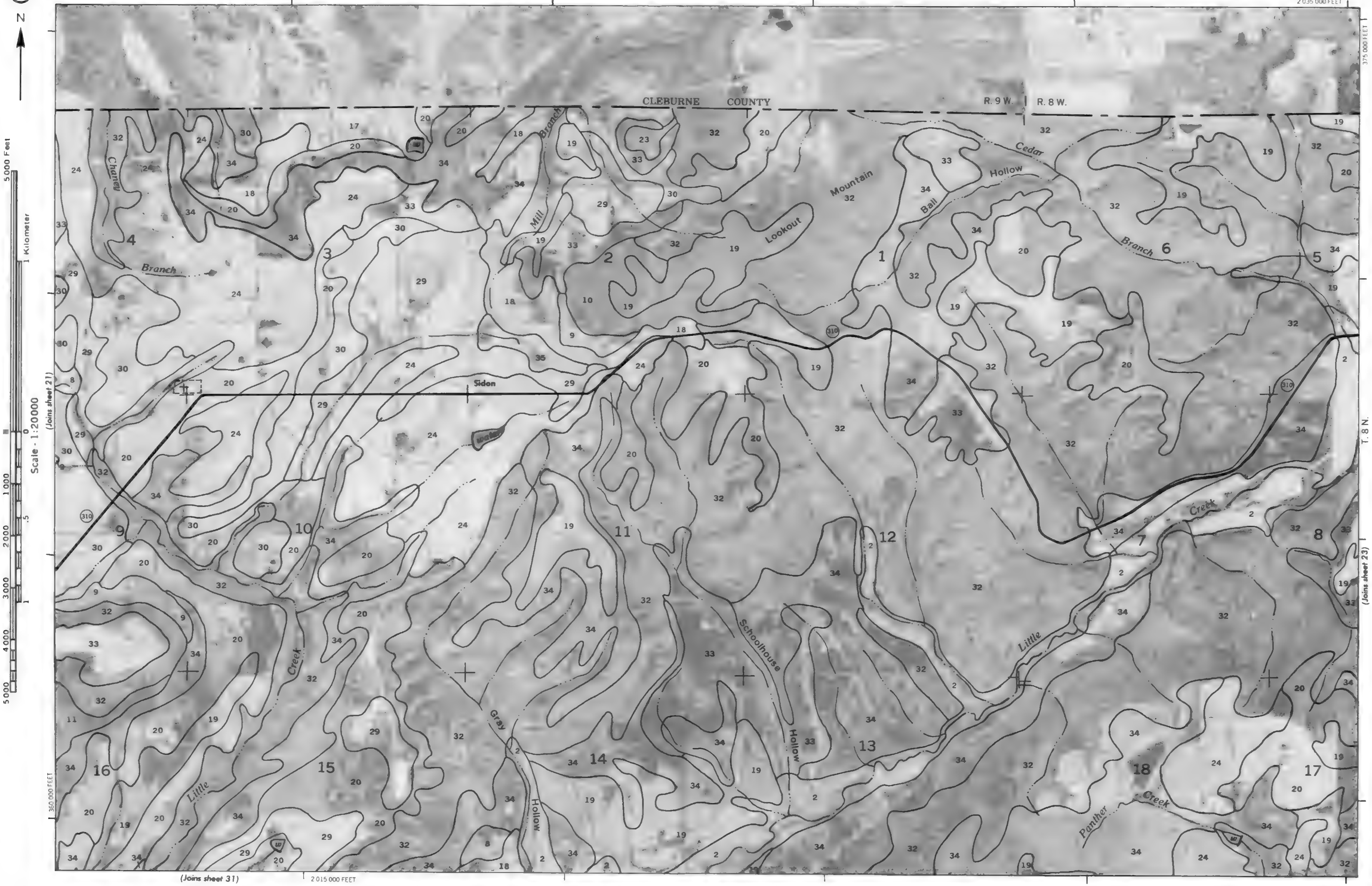

17
R. 6 W. | R. 5 W.
(Joins sheet 10)
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 26)
2 118 000 FEET
2 130 000 FEET
390 000 FEET
T. 9 N.
Pine
Creek
Stevens
Creek
Stevens Creek
Hollow
Huckleberry
Chinquapin
Creek
Overflow
Cr.
Twentythree
N
5000 Feet
1 Kilometer
Scale - 1:20000

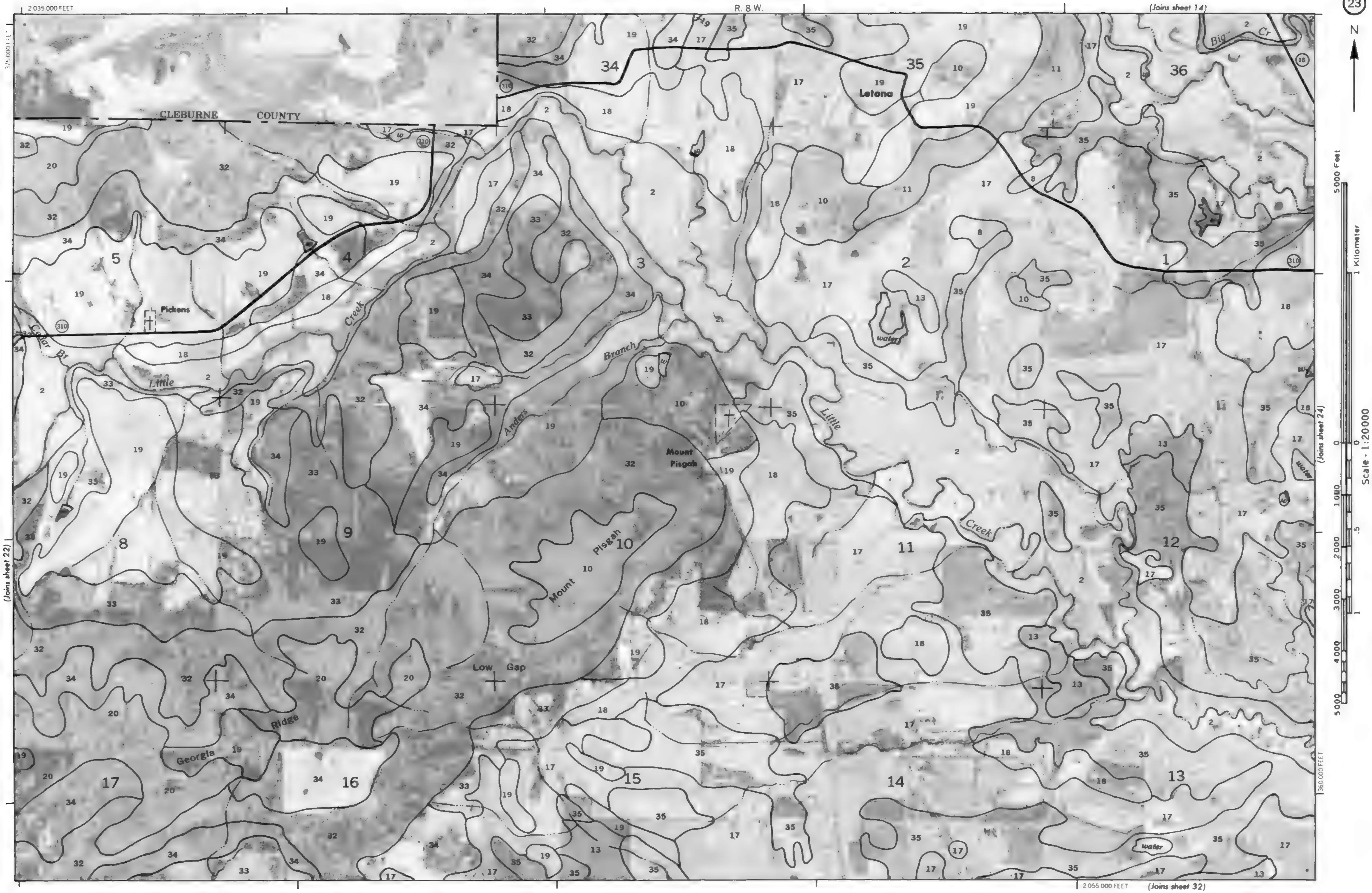

(Joins sheet 11)
R. 5 W. | R. 4 W.
2 155 000 FEET
390 000 FEET
N
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1
(Joins sheet 17)
(Joins sheet 19)
T. 9 N.
375 000 FEET
2 135 000 FEET
(Joins sheet 27)
Sugar Creek
Buzzard Roost Mountain
Glaise
Wolf Hollow Creek
Russell Mountain
Creek
Overflow
Russell
Keeler Corner
Missouri Pacific
67
367
367 BUS

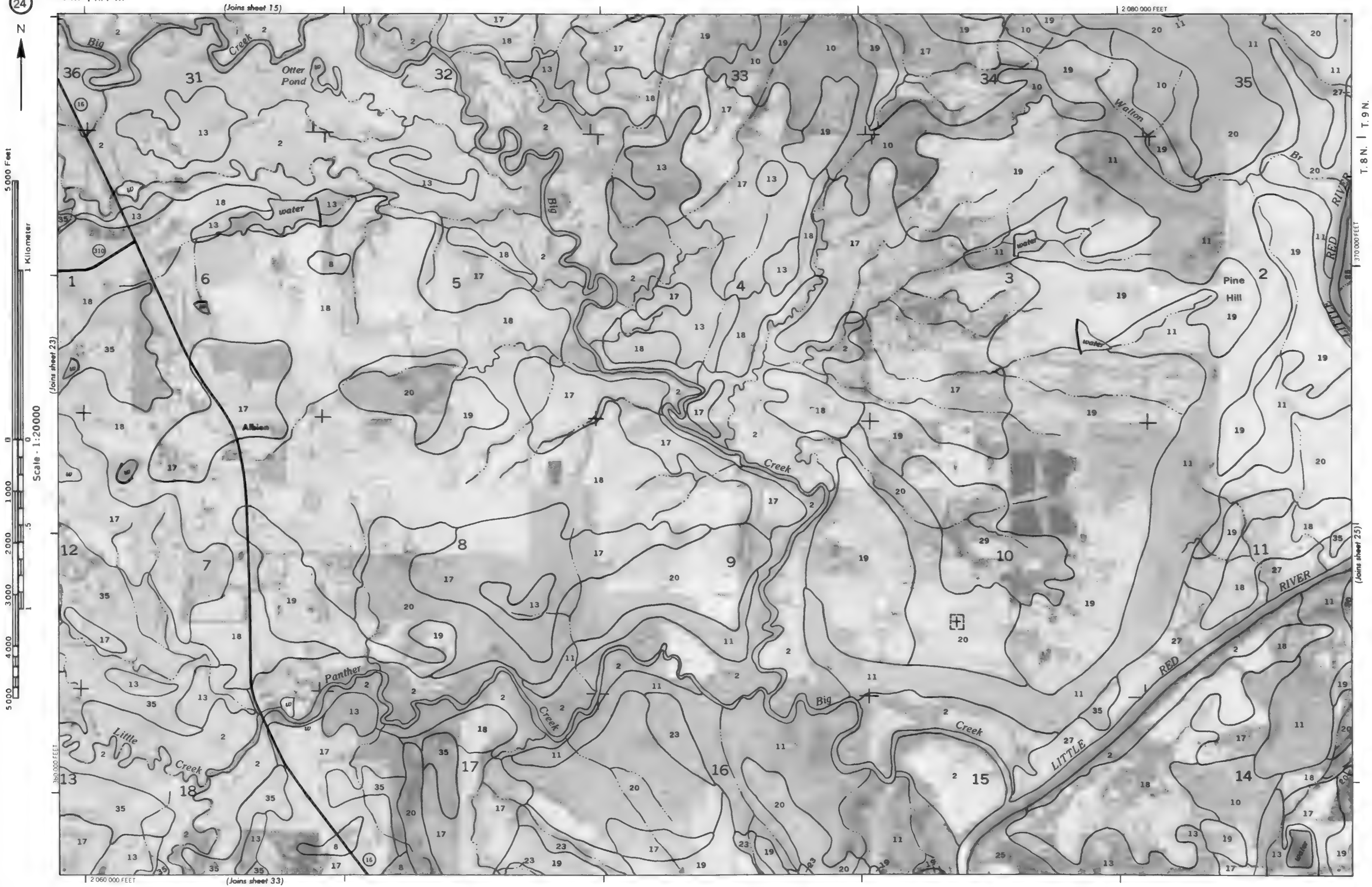

19
N
(Joins sheet 12)
(Joins sheet 28)
(Joins sheet 18)
(Joins inset, sheet 37)
R. 4 W.
T. 9 N.
2 160 000 FEET
2 180 000 FEET
390 000 FEET
370 000 FEET
Scale - 1:20000
5 000 Feet
1 Kilometer
MISSOURI PACIFIC
67
Butler Creek
Brushy Lake
Creek
Little Lake
Departee
Goose Pond
Bear Water Slough
Horseshoe Lake
WHITE RIVER
WOODRUFF COUNTY
WHITE COUNTY
water

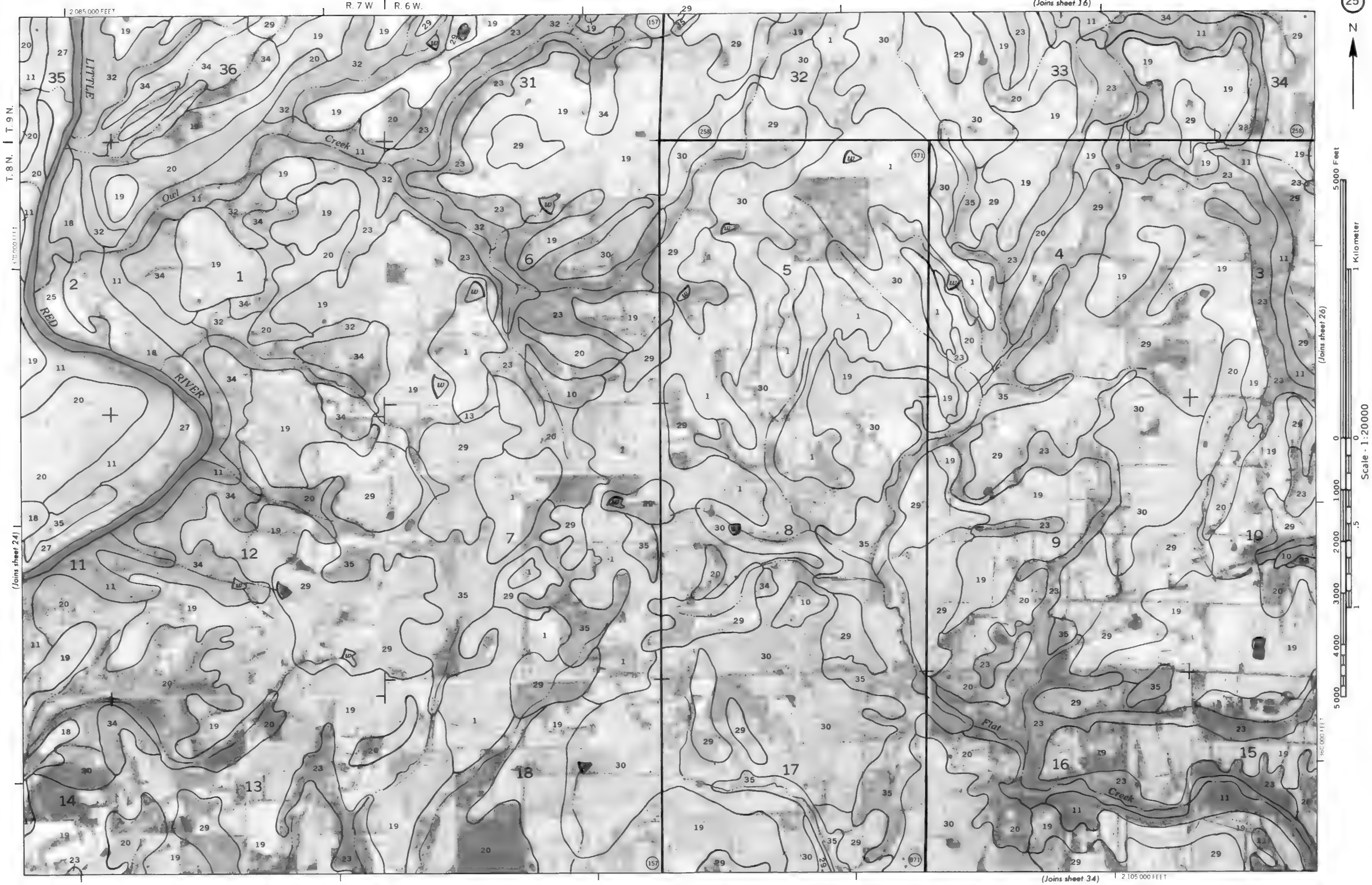

20
N
5000 Feet
1 Kilometer
Scale 1:20000
CLEBURNE COUNTY
R. 10 W.
FAULKNER COUNTY
T. 8 N.
Piney Creek
Blakey Branch
East Fork Cadron Creek
Jones Creek
Graham Branch
Bluff Mountain
Potter Hill
Potter Br.
Schoolhouse Hill
Rose Bud
water
1 985 000 FEET
375 000 FEET
1 965 000 FEET
360 000 FEET
(Joins sheet 21)
(Joins sheet 29)


CLEBURNE COUNTY
R. 10 W.
R. 9 W.
T. 8 N.
Graham Branch
Hudspeth Hollow
Big Hollow
Hanes Hollow
Hollow
Whitehead Ho
Hyde Branch
Branch
Creek
Spring
East Fork Cadron
Cedar Cr
BAYOU DES ARC
Plants Chapel
(Joins sheet 22)
(Joins sheet 28)
(Joins sheet 30)
N
5 000 Feet
1 Kilometer
Scale 1:20000


N
5000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 31)
2 035 000 FEET
375 000 FEET
360 000 FEET
2 015 000 FEET
CLEBURNE COUNTY
R. 9 W.
R. 8 W.
T. 8 N.
Cheney
Branch
Mill
Branch
Lookout
Mountain
Ball
Hollow
Cedar
Branch
Sidon
310
Creek
Little
Gray
Hollow
Schoolhouse
Hollow
Little
Creek
Panther
Creek

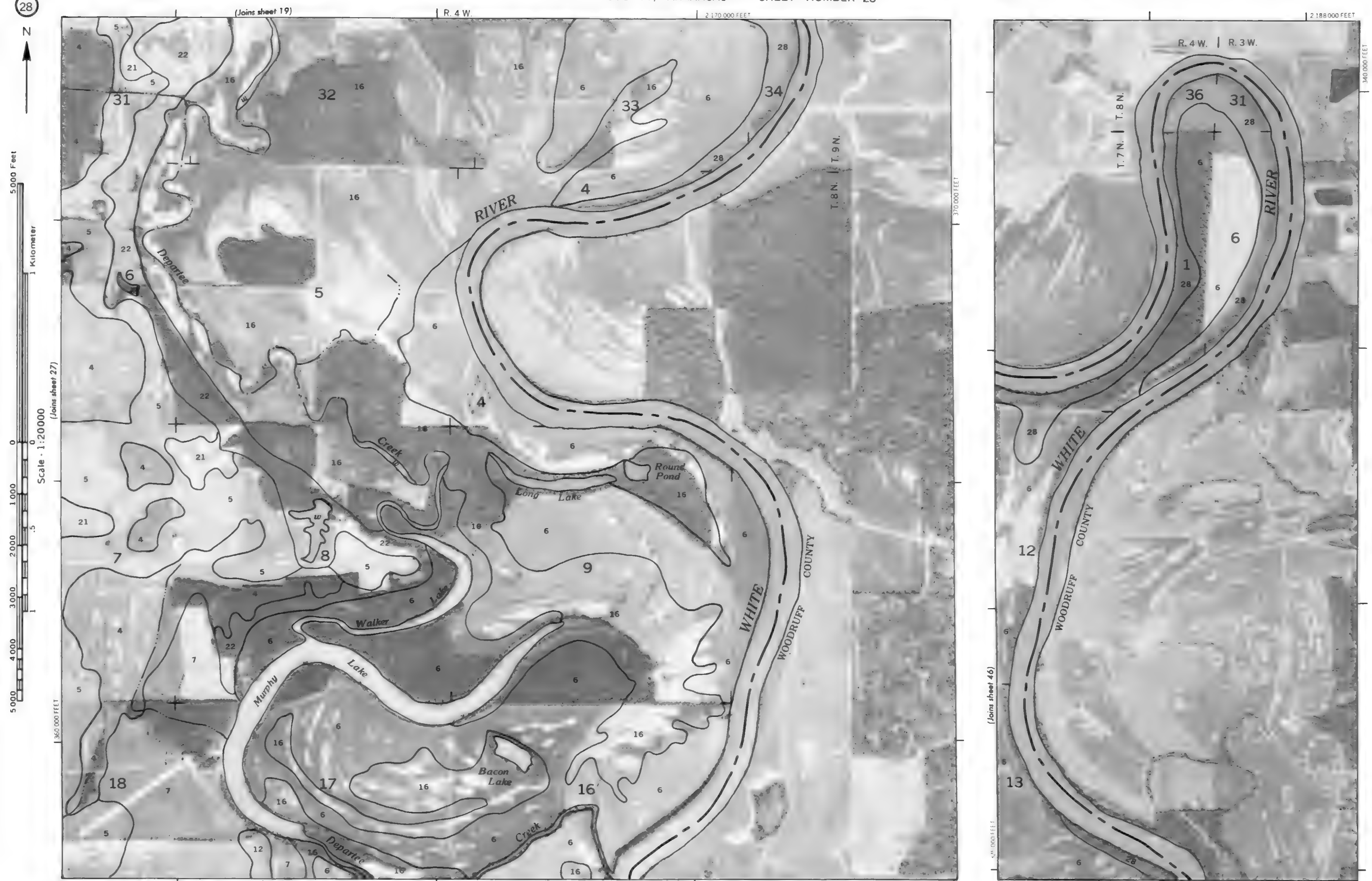

23
N
R. 8 W.
T. 9 N.
T. 8 N.
2 035 000 FEET
2 055 000 FEET
360 000 FEET
(Joins sheet 14)
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 32)
CLEBURNE COUNTY
Letona
Pickens
Mount Pisgah
Low Gap
Georgia Ridge
Little Creek
Anders Branch
Cedar Br
Big Cr
water
5000 Feet
1 Kilometer
Scale - 1:20000
310
16


R. 8 W. | R. 7 W.
(Joins sheet 15)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 33)
T. 8 N. | T. 9 N.
2 080 000 FEET
2 060 000 FEET
370 000 FEET
360 000 FEET
N
Scale - 1:20000
5 000 Feet
1 Kilometer
Big Creek
Otter Pond
water
Albion
Panther Creek
Little Creek
Walton Br
Pine Hill
RED RIVER
LITTLE RED RIVER


25
N
R. 7 W.
R. 6 W.
T. 9 N.
T. 8 N.
2 085 000 FEET
2 105 000 FEET
(Joins sheet 16)
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 34)
LITTLE
RED
RIVER
Owl
Creek
Flat
Creek
5000 Feet
1 Kilometer
Scale 1:20000

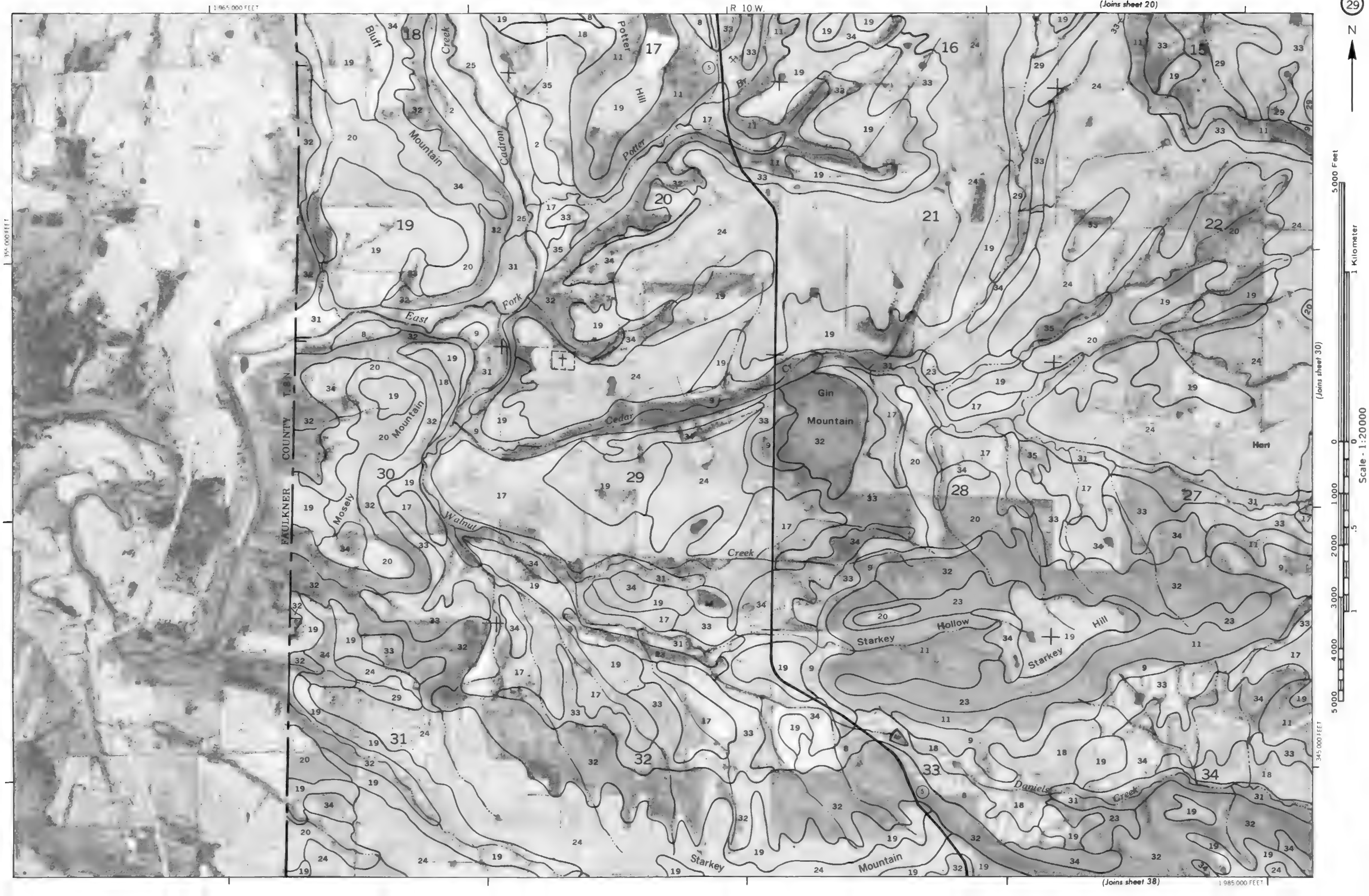
WHITE COUNTY, ARKANSAS — SHEET NUMBER 26

27
R. 5 W. | R. 4 W.
T. 8 N. | T. 9 N.
(Joins sheet 18)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 36)
2 135 000 FEET
2 155 000 FEET
370 000 FEET
360 000 FEET
Russell
PROJECTED
Keeler Corner
Big Mingo Creek
Little Mingo Creek
Glaise Creek
Gladey Creek
MISSOURI PACIFIC
N
5 000 Feet
1 Kilometer
Scale - 1:20000

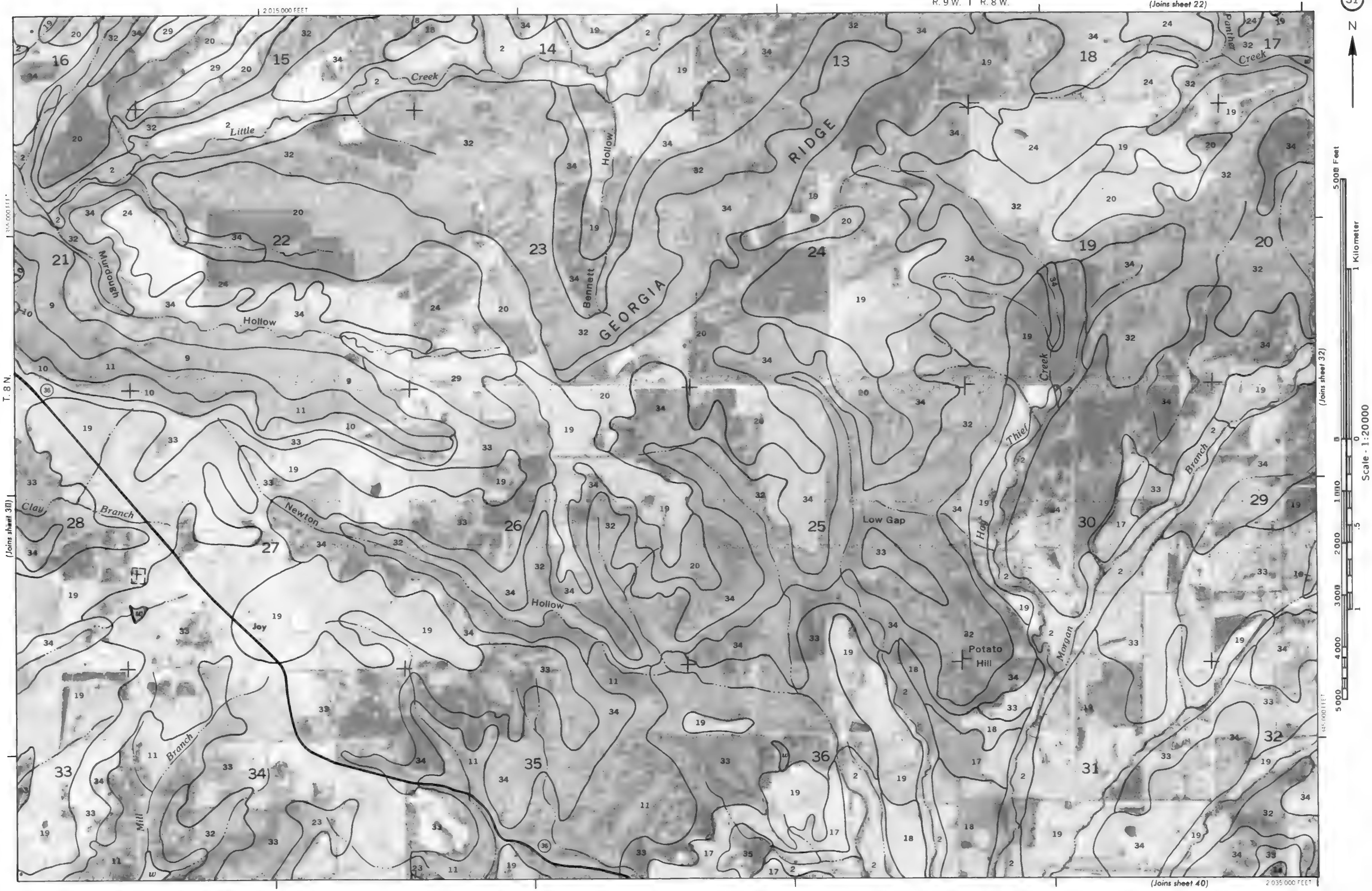


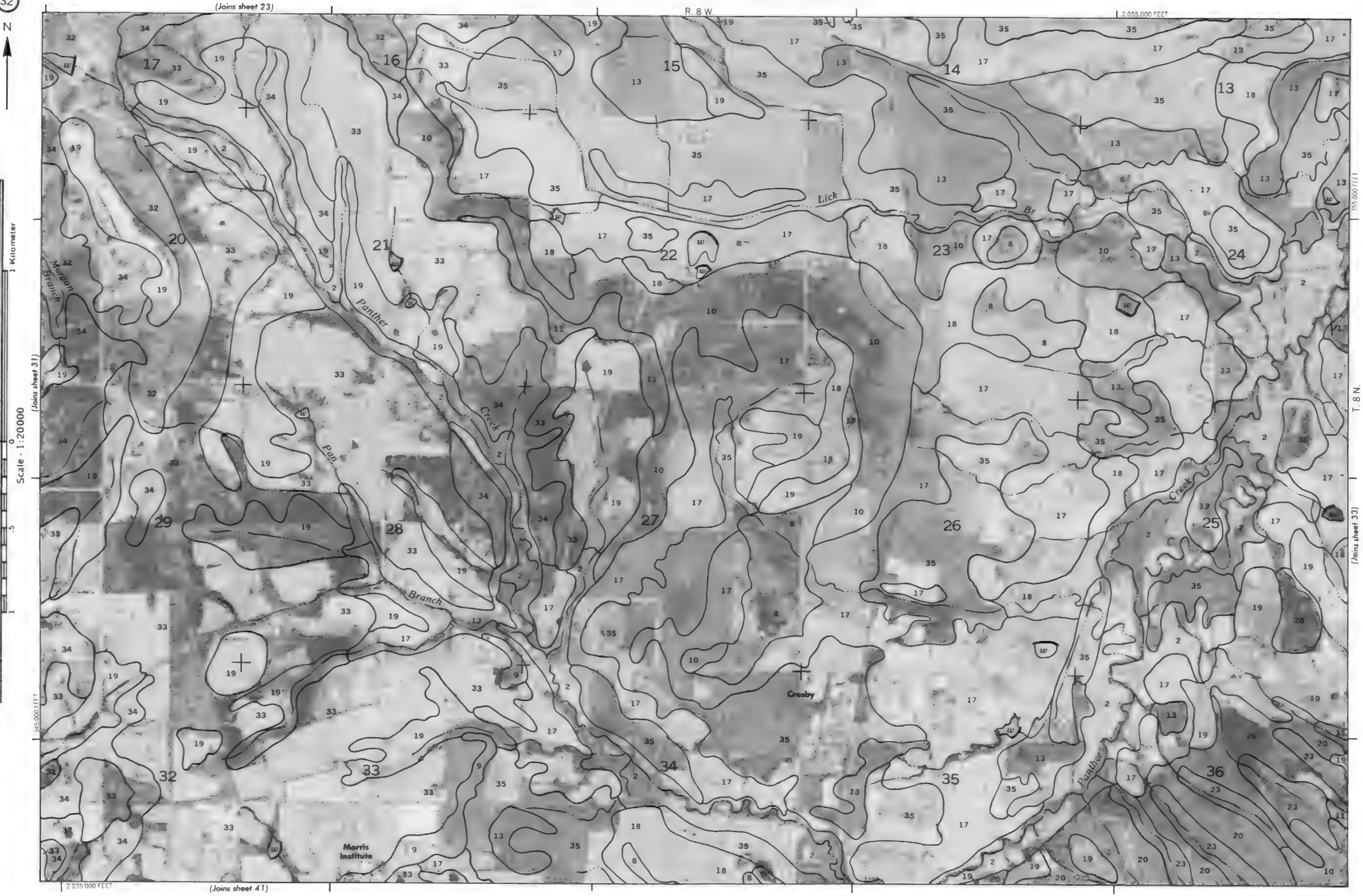
3000 AND 5000-FOOT GRID TICKS

WHITE COUNTY, ARKANSAS — SHEET NUMBER 29




(Joins sheet 21)
R. 10 W. | R. 9 W.
2 010 000 FEET
N
5000 Feet
1 Kilometer
Scale 1:20000
(Joins sheet 29)
(Joins sheet 31)
T. 8 N.
355 000 FEET
345 000 FEET
1 990 000 FEET
(Joins sheet 39)
Wortham Hill
Cedar Creek
DES ARC BAYOU
Clay Branch
Bad Slick Creek
Daniels Creek
36
310

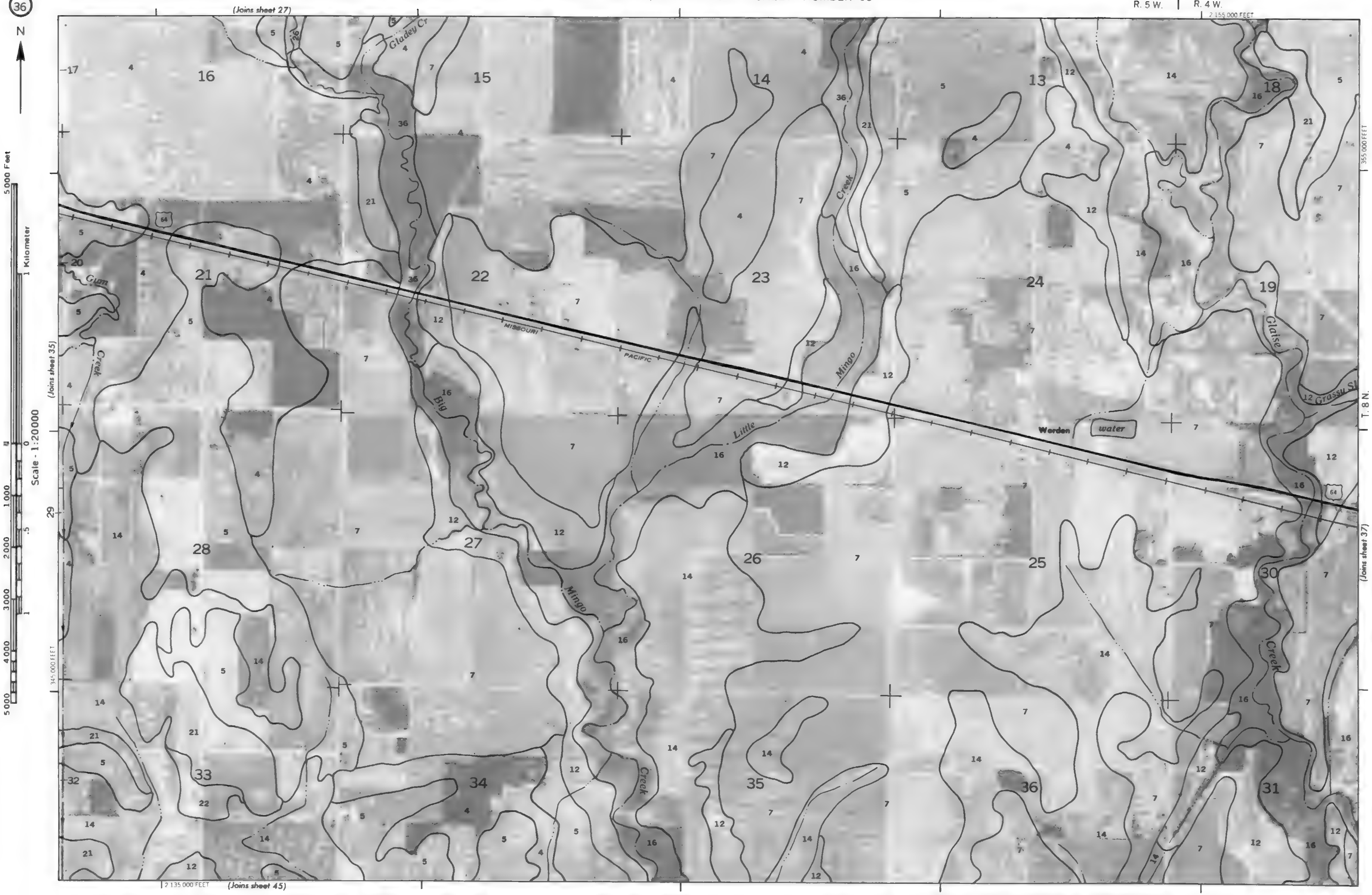

31
N
2 015 000 FEET
R. 9 W. | R. 8 W.
(Joins sheet 22)
(Joins sheet 32)
(Joins sheet 30)
(Joins sheet 40)
2 035 000 FEET
T. 8 N.
5000 Feet
1 Kilometer
Scale - 1:20000
GEORGIA RIDGE
Little Creek
Bennett Hollow
Murdough Hollow
Panther Creek
Thief Creek
Hog Thief Creek
Morgan Branch
Clay Branch
Newton Hollow
Mill Branch
Low Gap
Potato Hill
Joy
36


(Joins sheet 23)
R. 8 W.
2 055 000 FEET
355 000 FEET
T. 8 N.
(Joins sheet 33)
(Joins sheet 31)
(Joins sheet 41)
2 035 000 FEET
345 000 FEET
N
5 000 Feet
1 Kilometer
Scale - 1:20000
Morgan Branch
Panther Creek
Panther Branch
Lick Br
Creek
Panther
Crosby
Morris Institute


R. 8 W. | R. 7 W.
2 060 000 FEET
(Joins sheet 24)
N
355 000 FEET
T. 8 N.
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 42)
2 080 000 FEET
Panther
Creek
LITTLE
RED
RIVER
Fourmile Hill
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
0
1

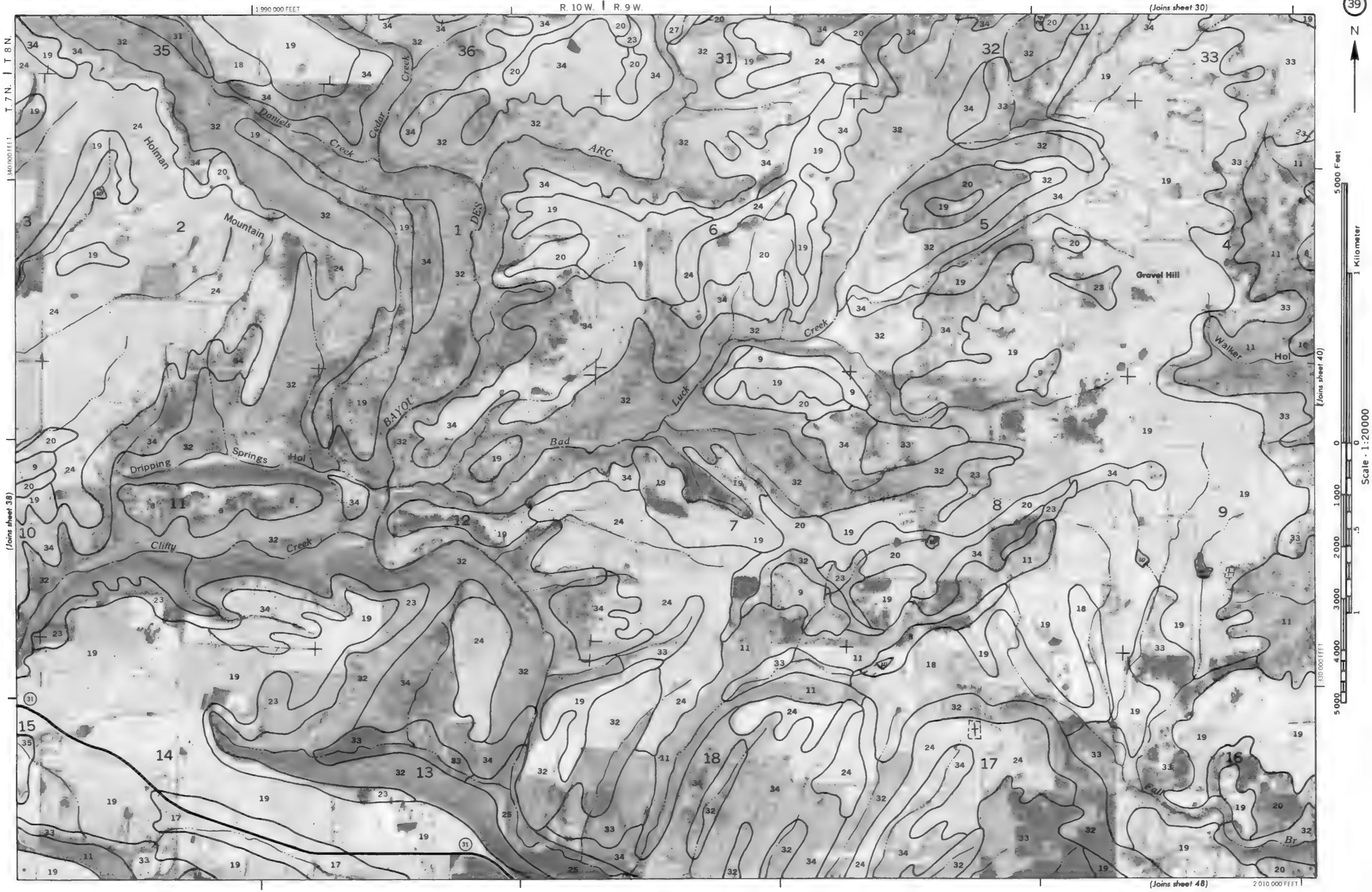
WHITE COUNTY, ARKANSAS — SHEET NUMBER 34


35
N
2 110 000 FEET
R. 6 W.
R. 5 W.
(Joins sheet 26)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 44)
2 130 000 FEET
T. 8 N.
Flat
Creek
Overflow
Gum
Creek
water
BALD KNOB
MISSOURI
PACIFIC
BALD KNOB
MUNICIPAL AIRPORT
Midway
JUDSONIA
5000 Feet
1 Kilometer
Scale 1:20000

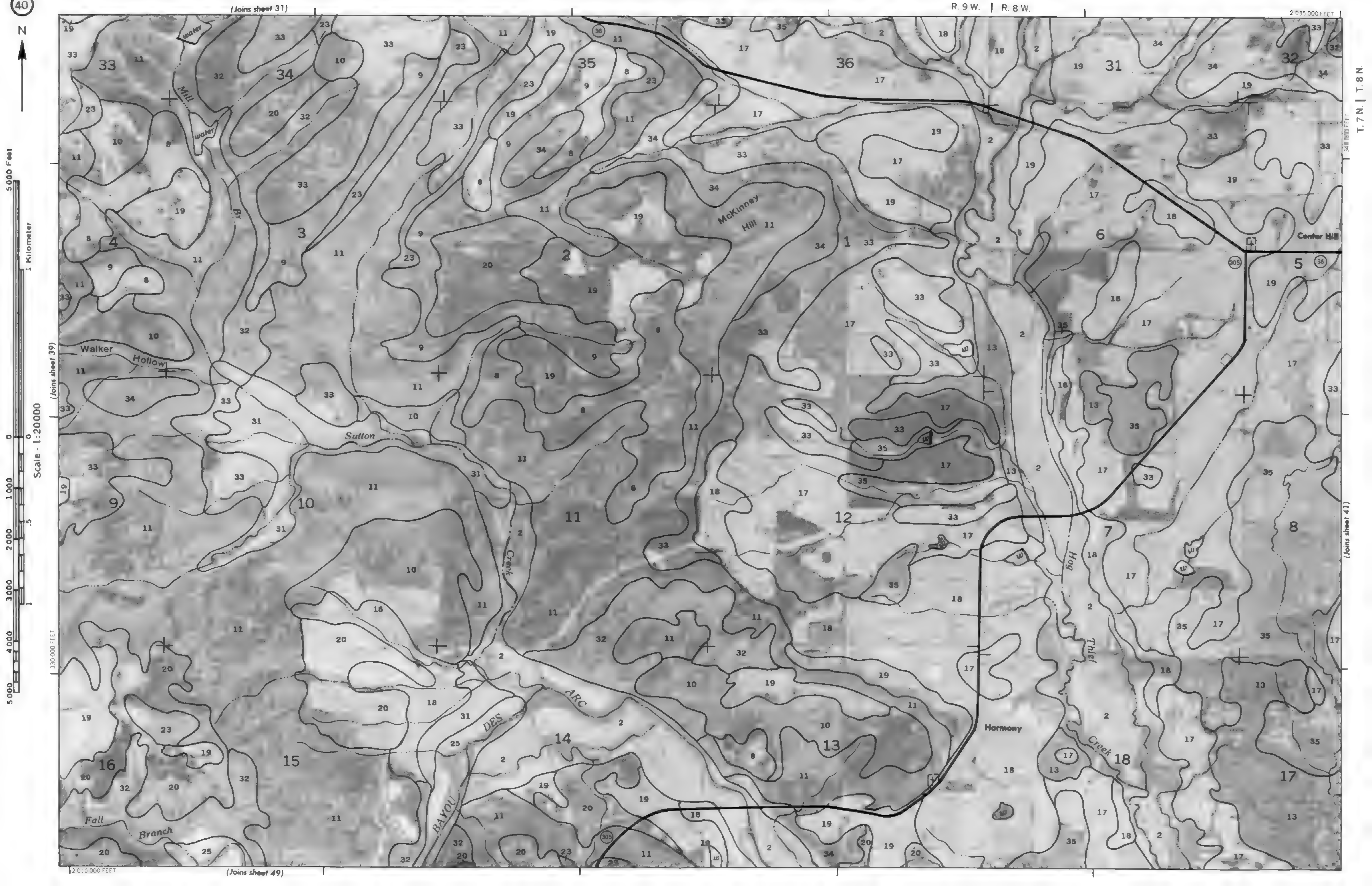

36
N
(Joins sheet 27)
R. 5 W.
R. 4 W.
2 155 000 FEET
355 000 FEET
T. 8 N.
(Joins sheet 35)
(Joins sheet 37)
(Joins sheet 45)
2 135 000 FEET
345 000 FEET
5 000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1
Gladey Cr
Cum
Creek
Big
Mingo
Little
Mingo
Creek
MISSOURI
PACIFIC
Worden
water
Glaise
Grassy Sl
Creek
64
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36


37
N
2 160 000 FEET
R. 4 W.
(Joins sheet 28)
355 000 FEET
T. 8 N.
(Joins sheet 36)
(Joins sheet 46)
2 180 000 FEET
Departee Cr
Slough
Grassy
Creek
Cut-off
water
WOODRUFF COUNTY
WHITE RIVER
Panther Point
Big Green Tom Lake
Little Green Tom Lake
Slough
MISSOURI PACIFIC
Big Clear Lake
Fifteen
Fourteen
Glaise Creek
64
2 183 000 FEET
(Joins sheet 13)
390 000 FEET
(Joins sheet 19)
T. 9 N.
380 000 FEET
145 000 FEET
2 185 000 FEET
2000 AND 5000 FOOT GRID TICKS
5000 Feet
1 Kilometer
Scale - 1:20000


(Joins sheet 29)
R. 10 W.
1 985 000 FEET
T. 8 N.
T. 7 N.
340 000 FEET
(Joins sheet 39)
(Joins sheet 47)
1 965 000 FEET
310 000 FEET
N
5 000 Feet
1 Kilometer
Scale - 1:20000
Starkey Mountain
Blue Hill
water
FAULKNER COUNTY
Clifty
Romance
Muddy Bayou

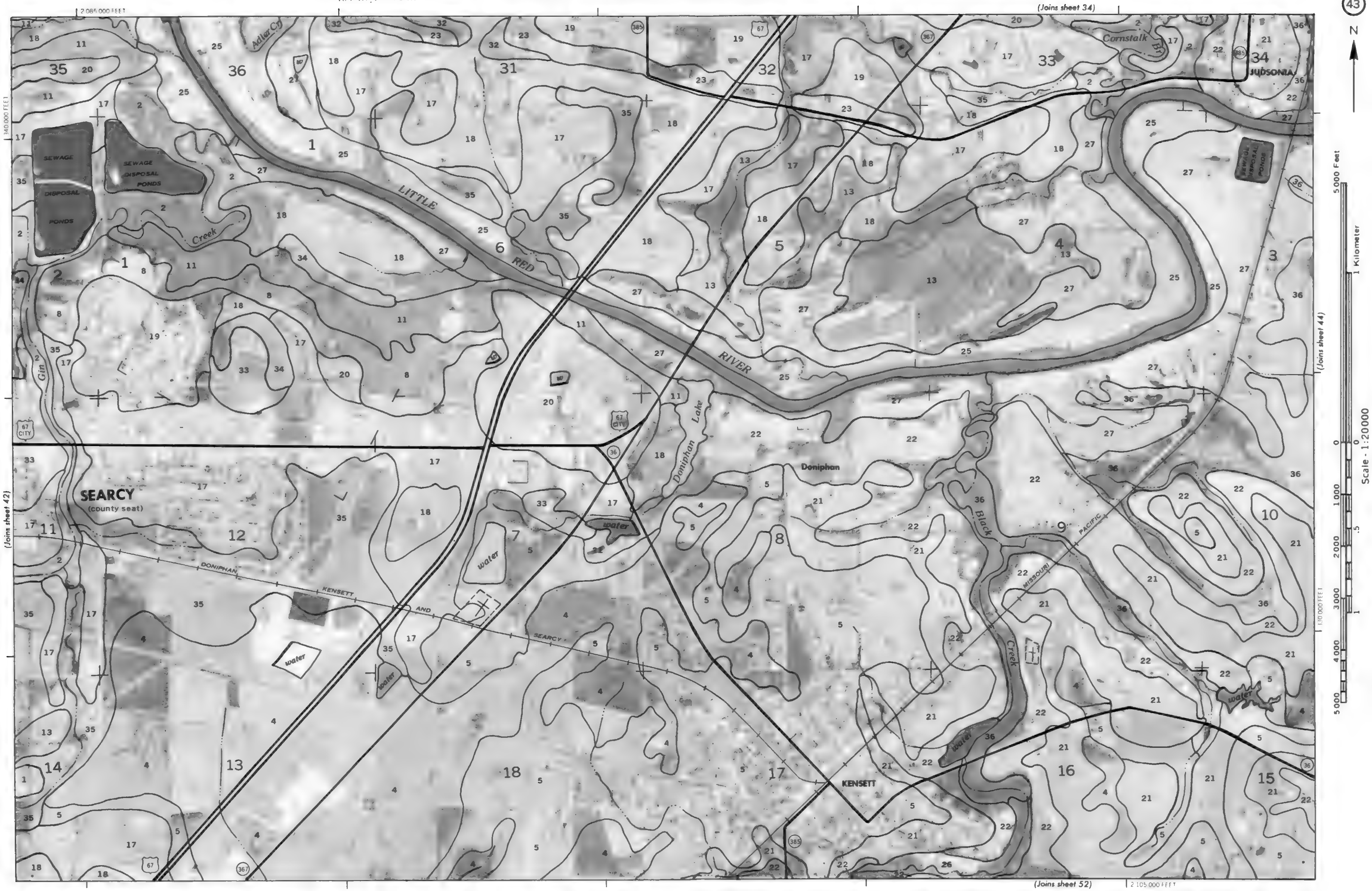


39
N
R. 10 W.
R. 9 W.
T. 8 N.
T. 7 N.
1 990 000 FEET
2 010 000 FEET
340 000 FEET
330 000 FEET
(Joins sheet 30)
(Joins sheet 40)
(Joins sheet 48)
(Joins sheet 38)
Holman Mountain
Daniels Creek
Cedar Creek
ARC
DES ARC BAYOU
Bad Luck Creek
Dripping Springs Hol
Clifty Creek
Gravel Hill
Walker Hol
Fall Br
31
5000 Feet
1 Kilometer
Scale 1:20000

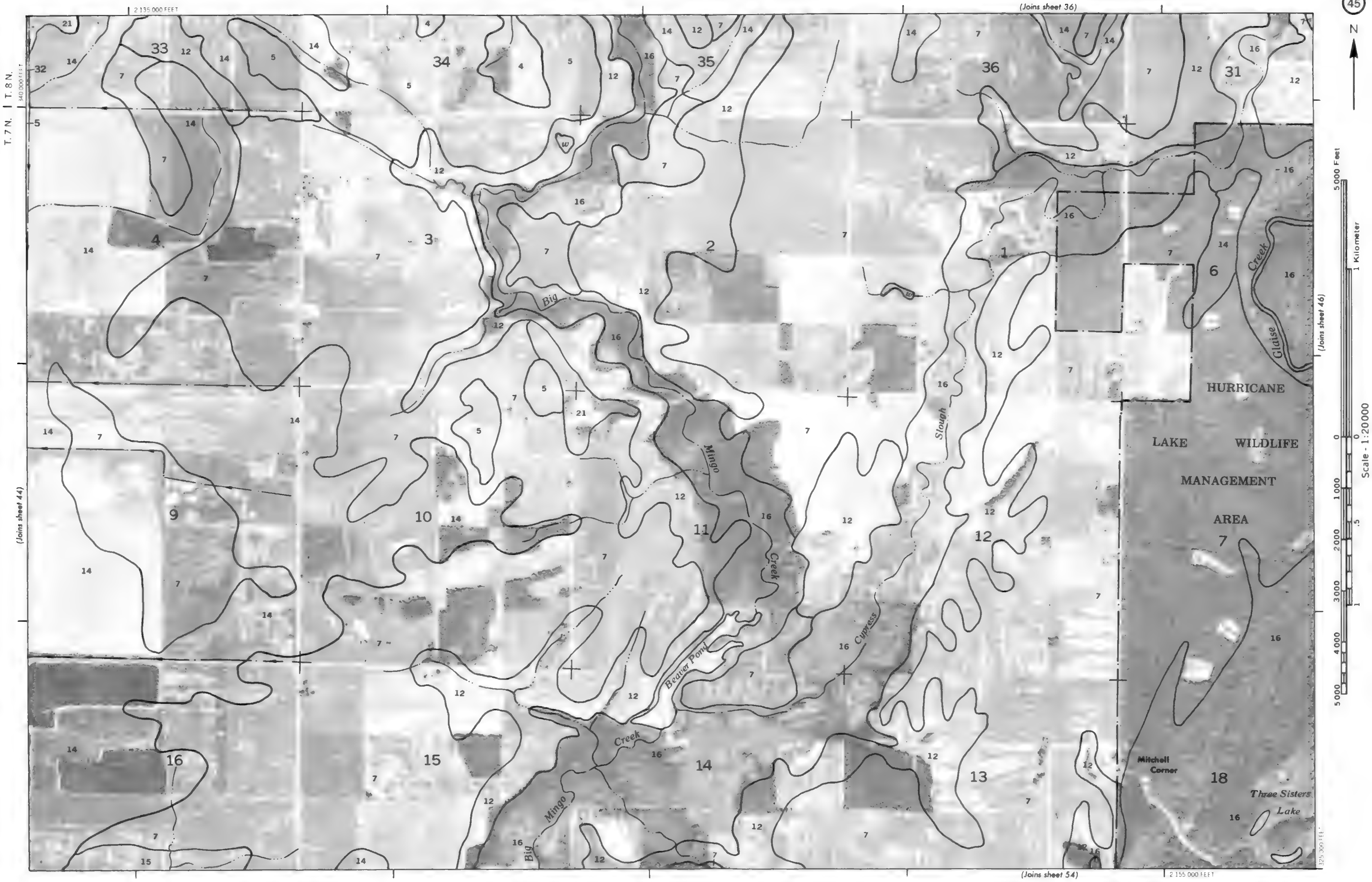

40
N
(Joins sheet 31)
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 49)
R. 9 W. | R. 8 W.
T. 7 N. | T. 8 N.
2 035 000 FEET
2 010 000 FEET
330 000 FEET
5 000 Feet
1 Kilometer
Scale - 1:20000
Mill Br.
water
McKinney Hill
Walker Hollow
Sutton
Center Hill
Creek
Hog Thief Creek
BAYOU DES ARC
Harmony
Fall Branch
36
305

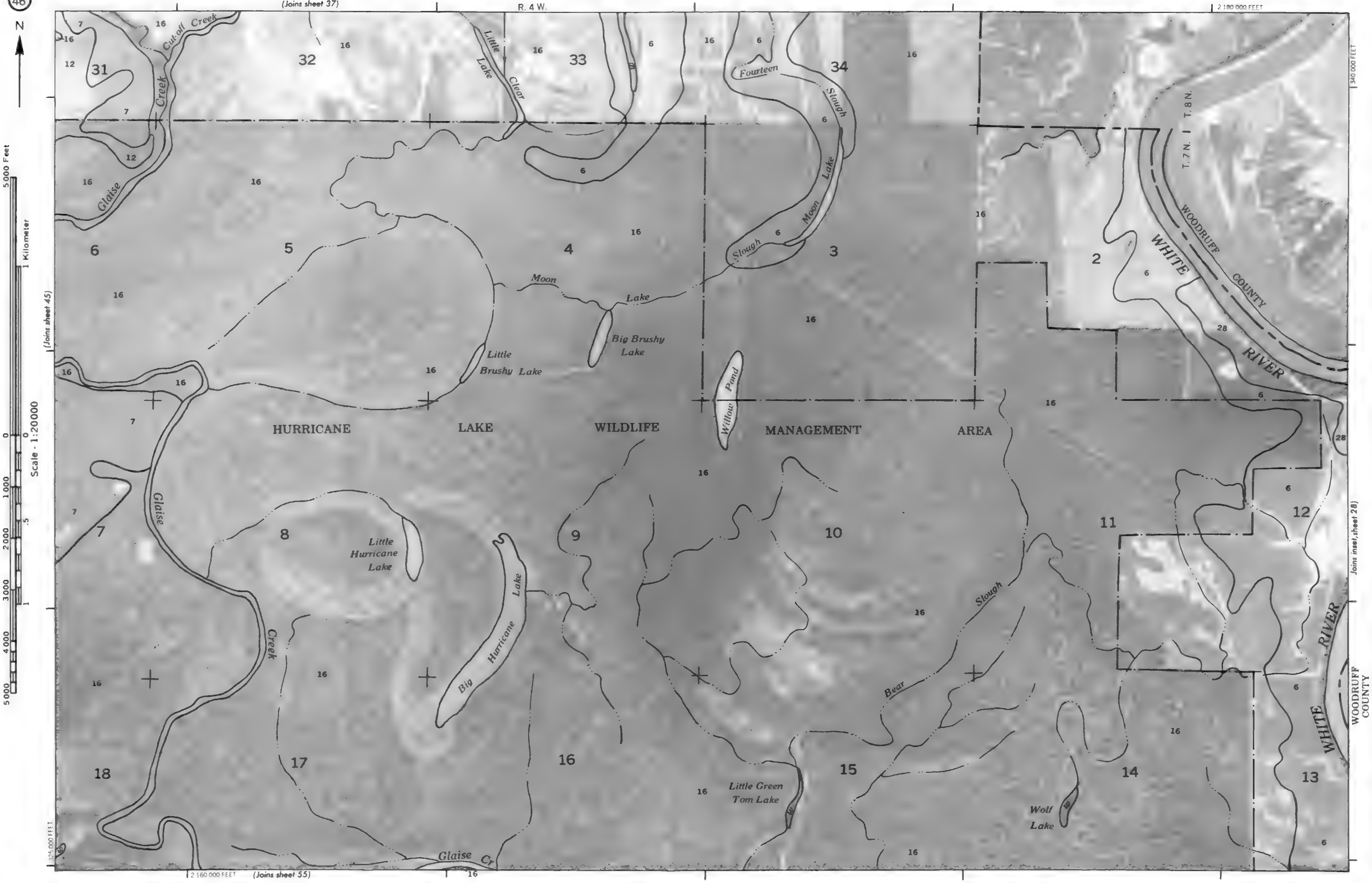

41
N
R. 8 W.
2 035 000 FEET
(Joins sheet 32)
T. 7 N. | T. 8 N.
Morris Institute
Center Hill
Panther Cr
Jaybird
Branch
Slayton
Branch
Degnet Creek
HONEY HILL RIDGE
water
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 50)
2 055 000 FEET
R. 8 W. | R. 7 W.
5 000 Feet
1 Kilometer
Scale 1:20000

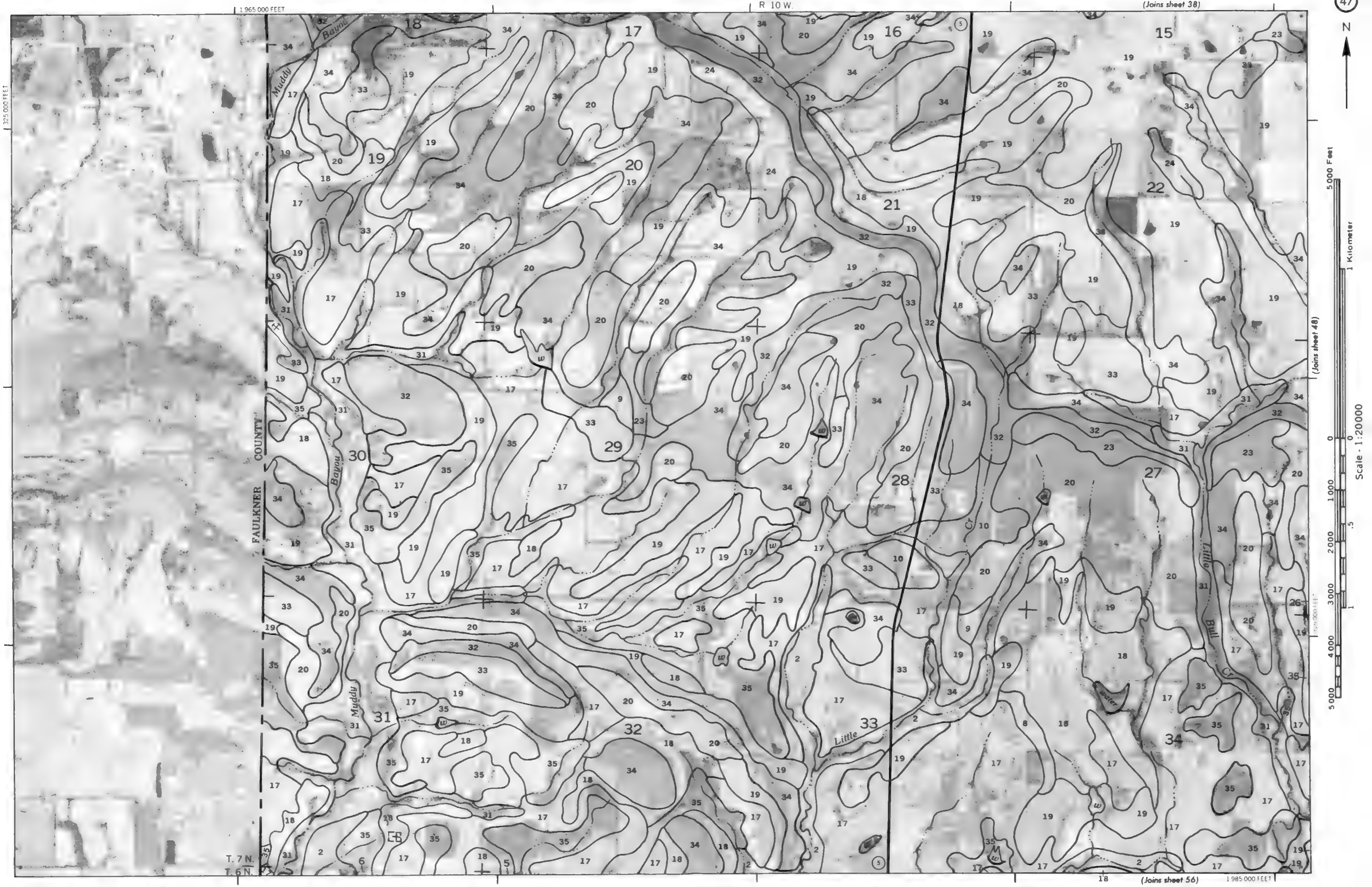
(Joins sheet 33)
(Joins sheet 41)
(Joins sheet 43)
(Joins sheet 51)
2 080 000 FEET
2 060 000 FEET
340 000 FEET
330 000 FEET
T. 7 N. | T. 8 N.
N
Scale 1:20000
5 000 Feet
1 Kilometer
SEARCY
(county seat)
HARDING UNIVERSITY
Backbone Ridge
Rocky Branch
Deener Creek
Branch
Gin Creek
Key
Gum Springs Creek
DONIPHAN KENSETT AND SEARCY
water

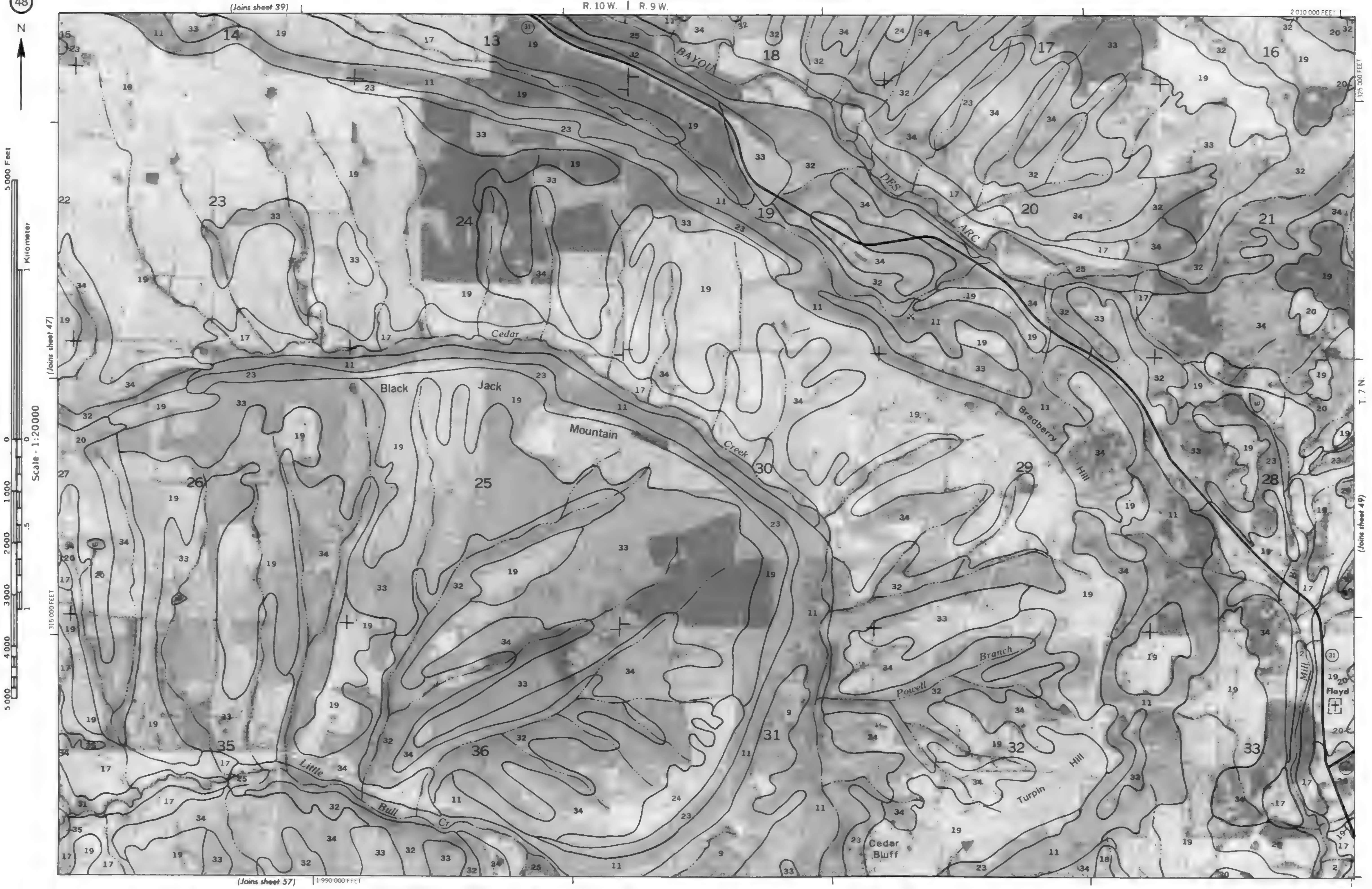

R. 7 W. | R. 6 W.
T. 7 N. | T. 8 N.
43
N
2 085 000 FEET
2 105 000 FEET
340 000 FEET
330 000 FEET
(Joins sheet 34)
(Joins sheet 44)
(Joins sheet 52)
(Joins sheet 42)
SEARCY
(county seat)
JUDSONIA
Doniphan
KENSETT
LITTLE RED RIVER
Adler Cr
Cornstalk Br
Creek
Gin
Doniphan Lake
Black Creek
SEWAGE DISPOSAL PONDS
water
DONIPHAN KENSETT AND SEARCY
MISSOURI PACIFIC
Scale - 1:20000
1 Kilometer
5 000 Feet

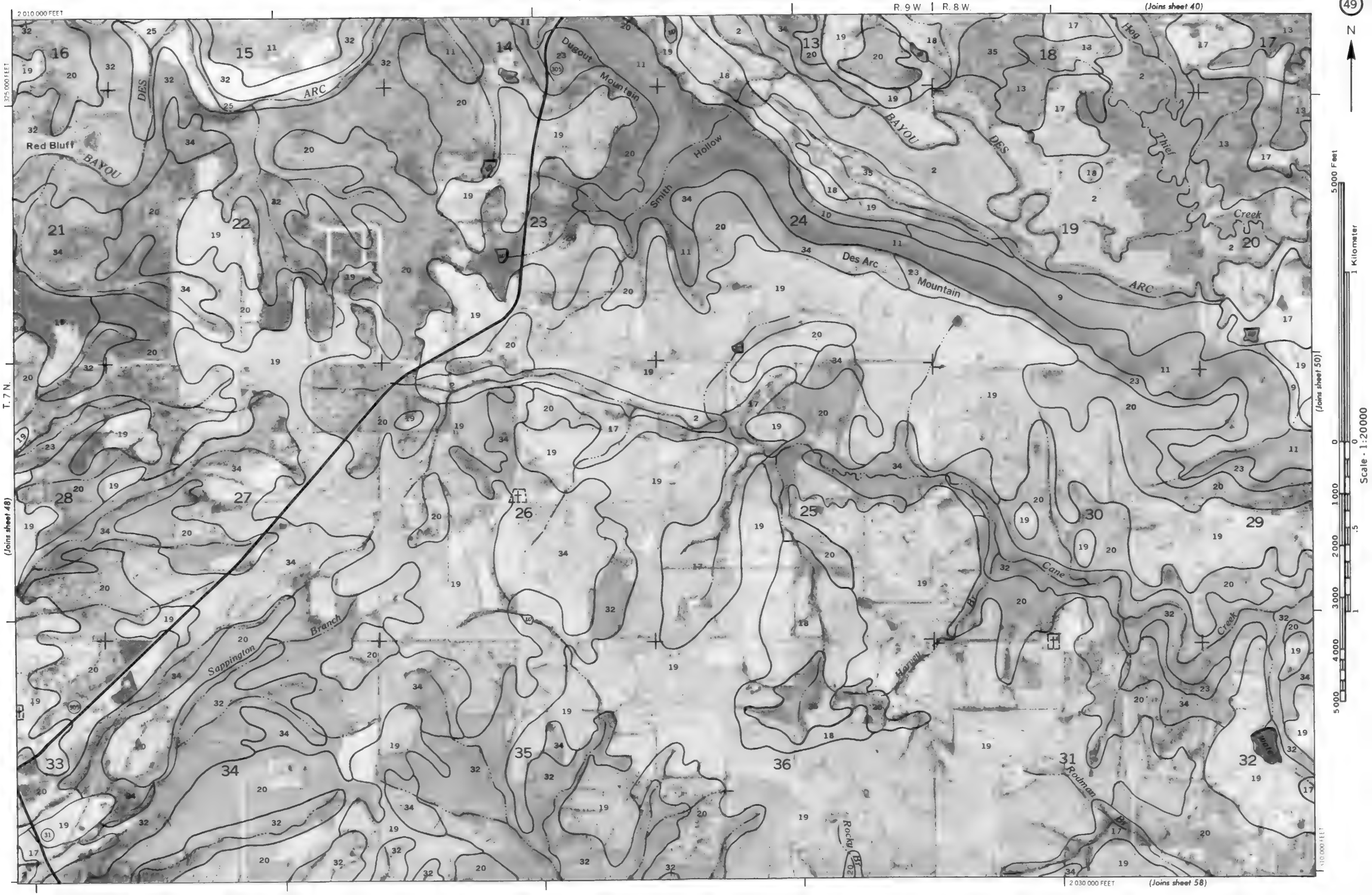

44
N
(Joins sheet 35)
R. 6 W. | R. 5 W.
2 130 000 FEET
340 000 FEET
T. 7 N. | T. 8 N.
JUDSONIA
MISSOURI PACIFIC
Conley Bend
LITTLE RED RIVER
Overflow
Creek
Hogpen Ridge
Overflow Creek
(Joins sheet 43)
(Joins sheet 45)
330 000 FEET
2 110 000 FEET
(Joins sheet 53)
5 000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1


R 5 W.
R 4 W.
T. 8 N.
T. 7 N.
2 135 000 FEET
2 155 000 FEET
340 000 FEET
325 000 FEET
(Joins sheet 36)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 54)
33
34
35
36
31
4
3
2
1
6
9
10
11
12
13
14
15
16
18
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
Big Mingo Creek
Slough
Glaise Creek
Cypress
Beaver Pond
Mitchell Corner
Three Sisters Lake
N
5000 Feet
1 Kilometer
Scale - 1:20000


(Joins sheet 37)
R. 4 W.
2 180 000 FEET
340 000 FEET
T. 7 N.
T. 8 N.
(Joins sheet 45)
Joins inset, sheet 28
(Joins sheet 55)
2 160 000 FEET
325 000 FEET
N
5 000 Feet
1 Kilometer
Scale - 1:20000
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
Cut-off Creek
Glaise Creek
Little Lake
Clear
Fourteen Slough
Moon Lake
Slough
Moon Lake
Little Brushy Lake
Big Brushy Lake
Willow Pond
Little Hurricane Lake
Big Hurricane Lake
Bear Slough
Little Green Tom Lake
Wolf Lake
Glaise Cr
WHITE RIVER
WOODRUFF COUNTY
WHITE COUNTY
WOODRUFF COUNTY

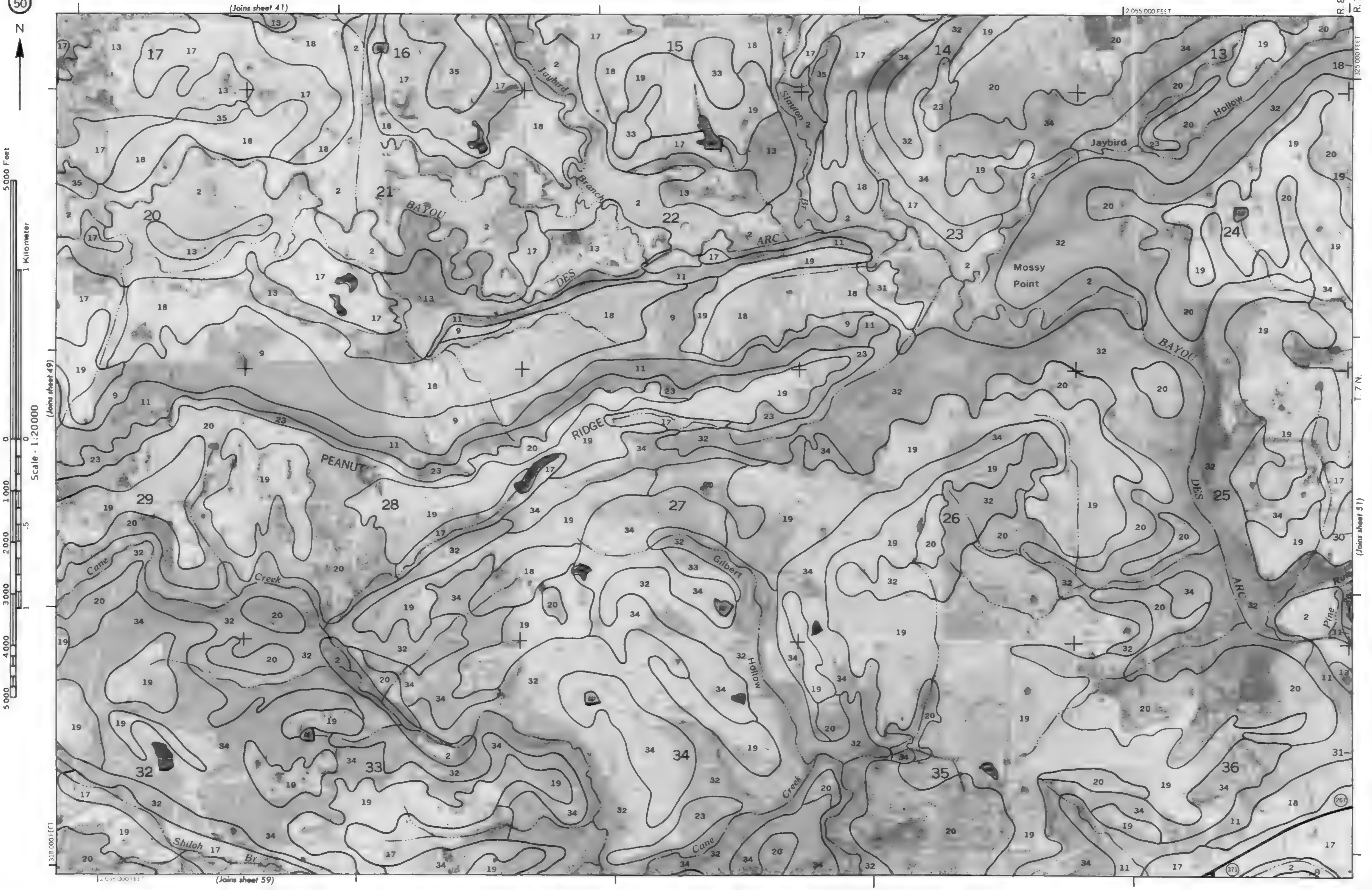

47
N
1 965 000 FEET
R. 10 W.
(Joins sheet 38)
(Joins sheet 48)
(Joins sheet 56)
1 985 000 FEET
325 000 FEET
FAULKNER COUNTY
T. 7 N.
T. 6 N.
Muddy Bayou
Little Bull Cr.
Little
5000 Feet
1 Kilometer
Scale - 1:20000

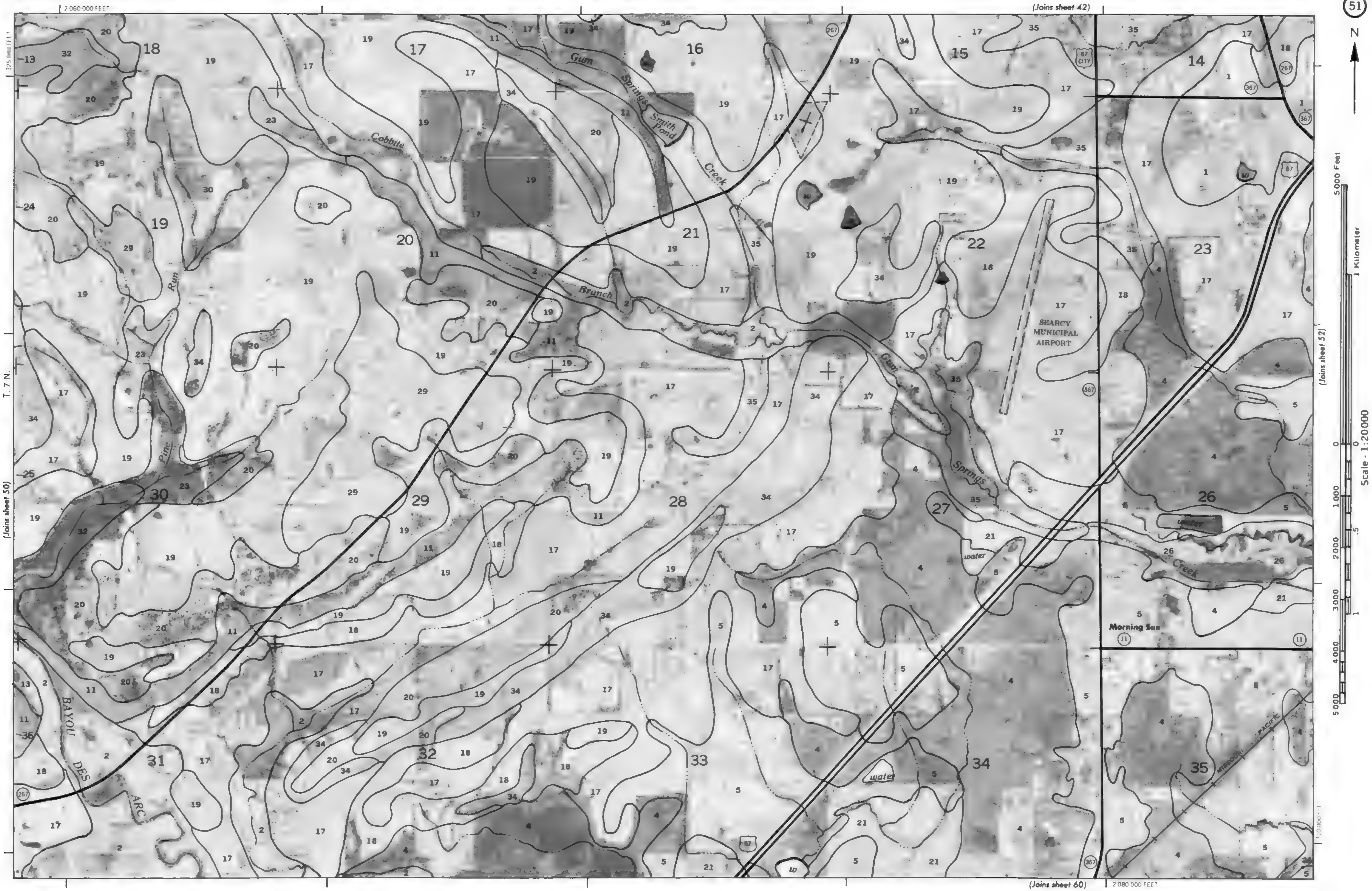

48
N
(Joins sheet 39)
R. 10 W.
R. 9 W.
2 010 000 FEET
325 000 FEET
T. 7 N.
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 57)
1 990 000 FEET
315 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000
BAYOU
DES
ARC
Cedar
Creek
Black
Jack
Mountain
Bradberry
Hill
Powell
Branch
Turpin
Hill
Little
Bull
Cr
Cedar
Bluff
Floyd
Mill

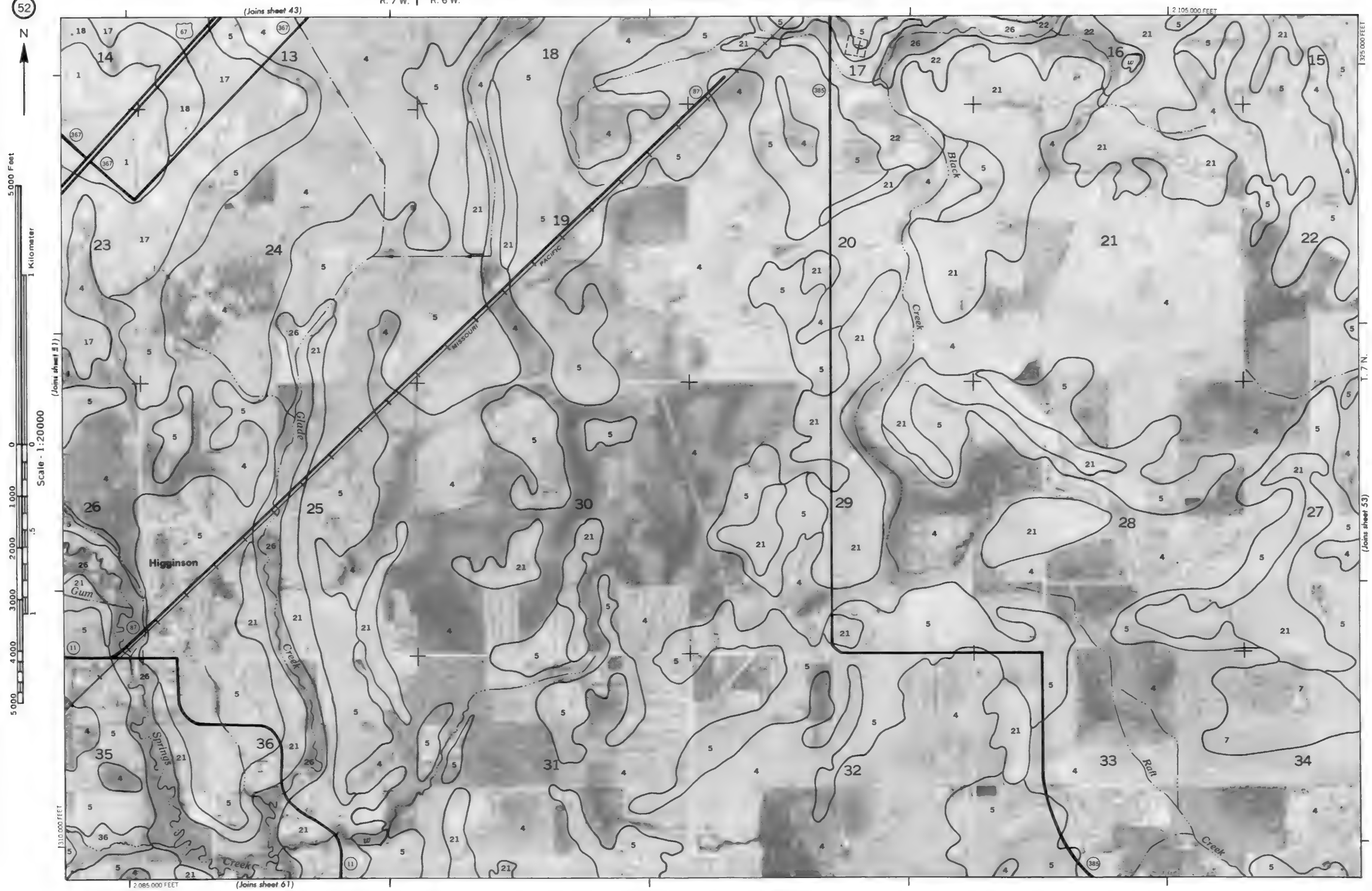

49
N
R. 9 W.
R. 8 W.
(Joins sheet 40)
(Joins sheet 48)
(Joins sheet 50)
(Joins sheet 58)
2 010 000 FEET
2 030 000 FEET
325 000 FEET
T. 7 N.
Red Bluff
DES ARC BAYOU
Dugout Mountain
Smith Hollow
Des Arc Mountain
Hog Thief Creek
Sappington Branch
Cane Creek
Harvey Br
Rodman Br
Rocky Br
Scale - 1:20000
5 000 Feet
1 Kilometer

50

WHITE COUNTY, ARKANSAS — SHEET NUMBER 50

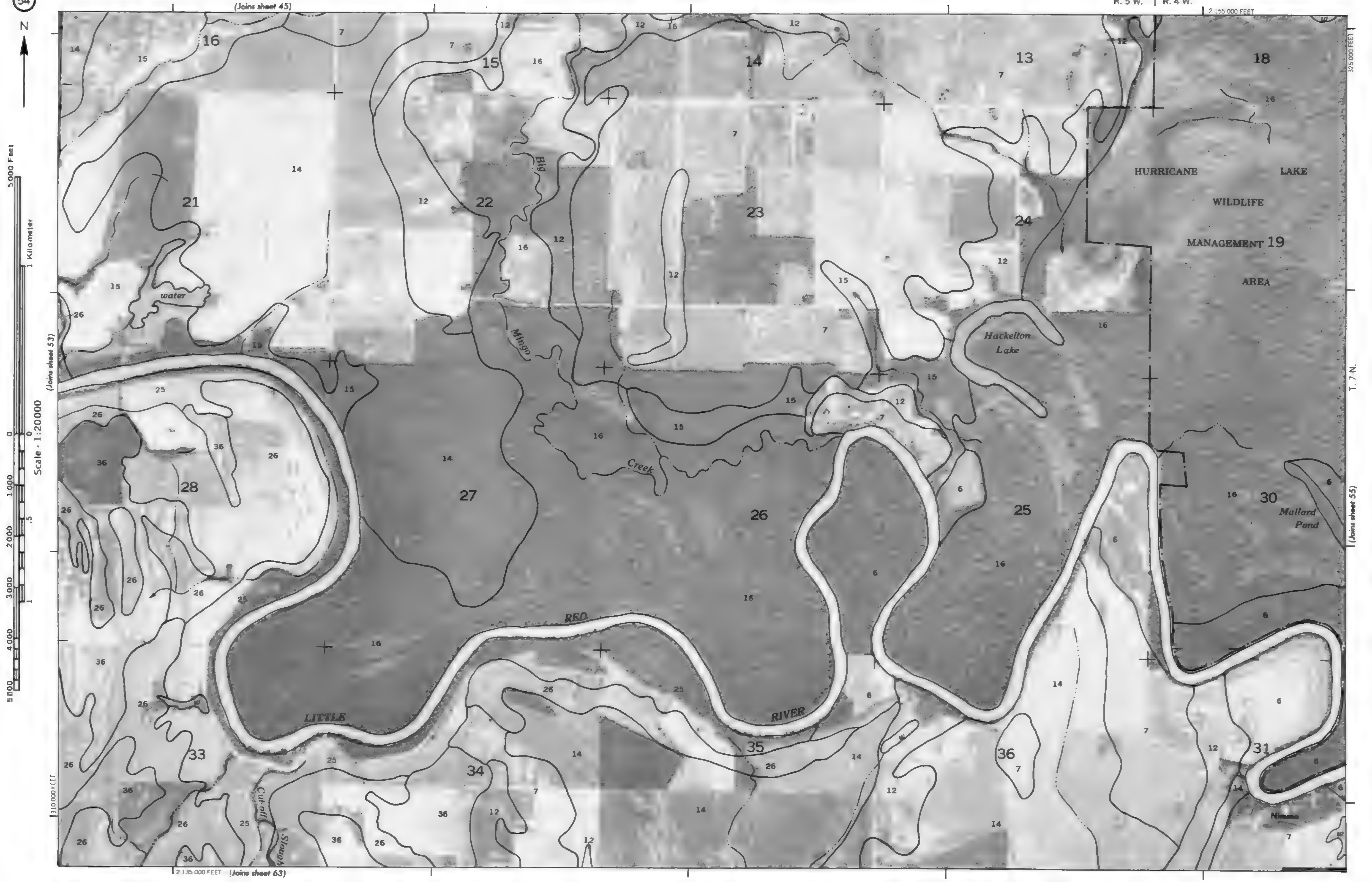


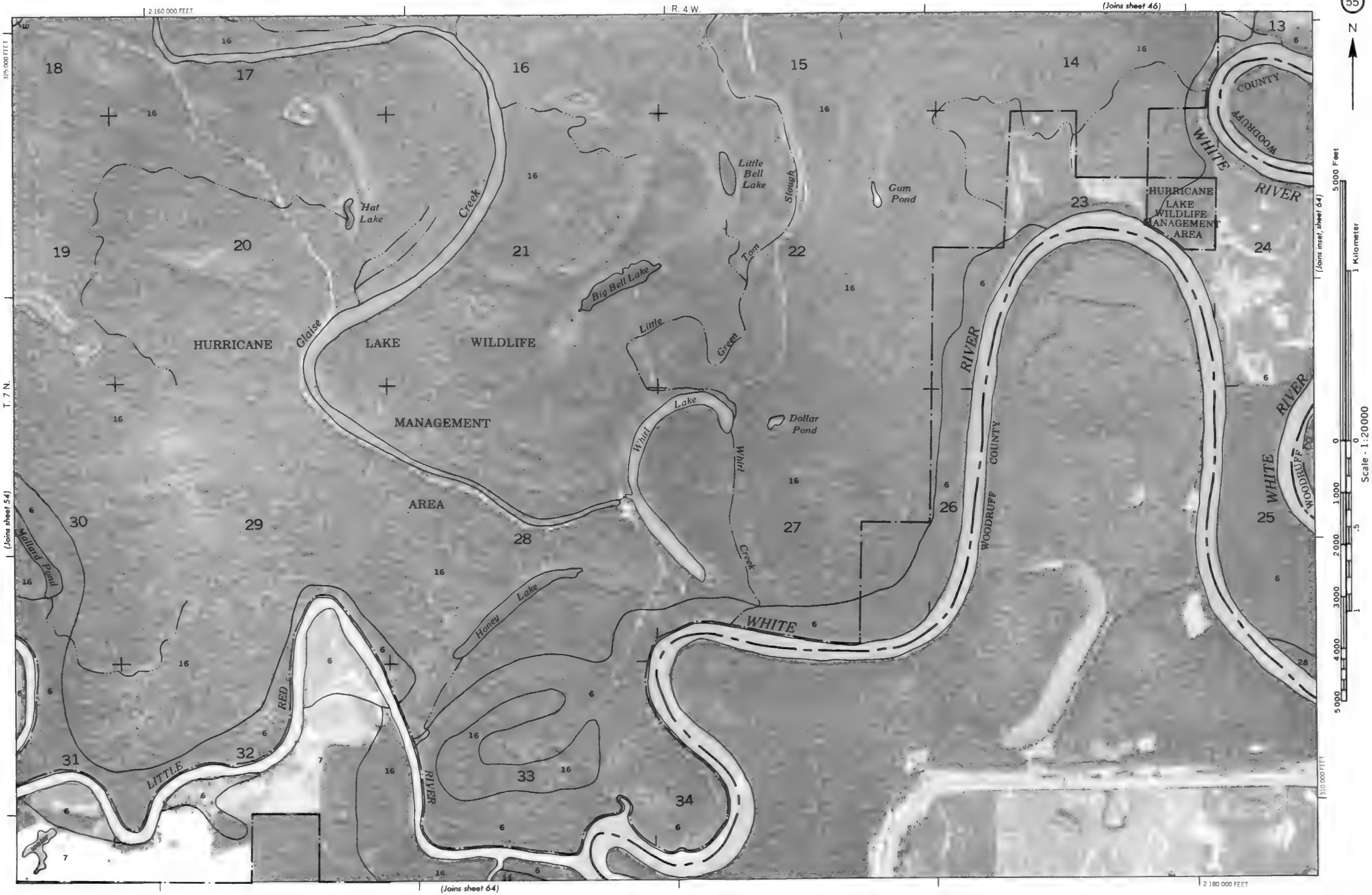

(Joins sheet 42)
(Joins sheet 52)
(Joins sheet 60)
(Joins sheet 50)
2 060 000 FEET
2 080 000 FEET
325 000 FEET
T. 7 N.
Gum Springs
Smith Pond
Cobbite Creek
Branch
Pine Run
Gum Springs Creek
SEARCY MUNICIPAL AIRPORT
Morning Sun
BAYOU DES ARC
MISSOURI PACIFIC
water
N
5000 Feet
1 Kilometer
Scale - 1:20000

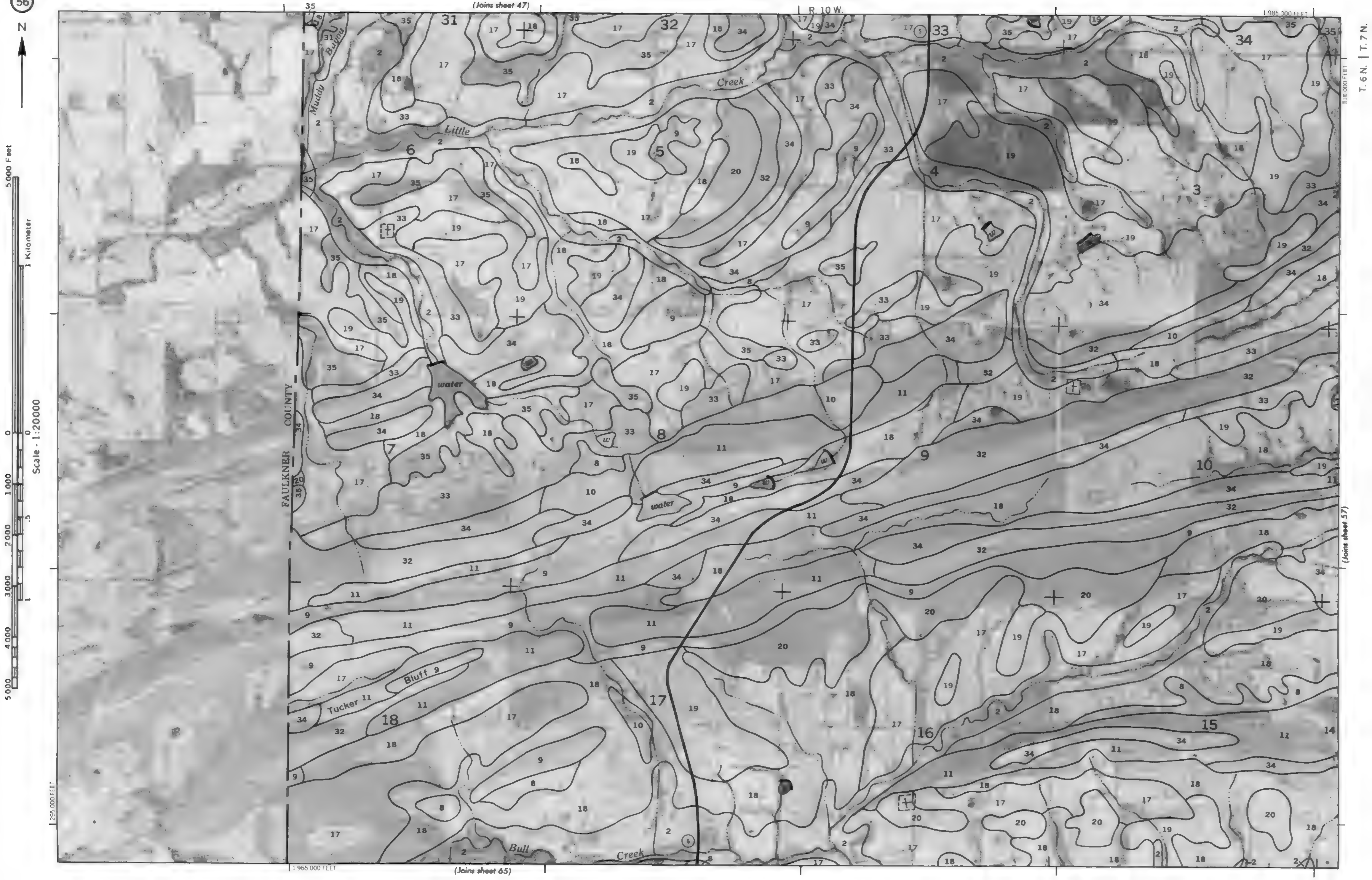

52
N
R. 7 W.
R. 6 W.
(Joins sheet 43)
(Joins sheet 51)
(Joins sheet 53)
(Joins sheet 61)
T. 7 N.
2 105 000 FEET
325 000 FEET
310 000 FEET
2 085 000 FEET
Higginson
Glade Creek
Black Creek
Raft Creek
Gum
Springs Creek
MISSOURI PACIFIC
Scale 1:20000
5 000 Feet
1 Kilometer

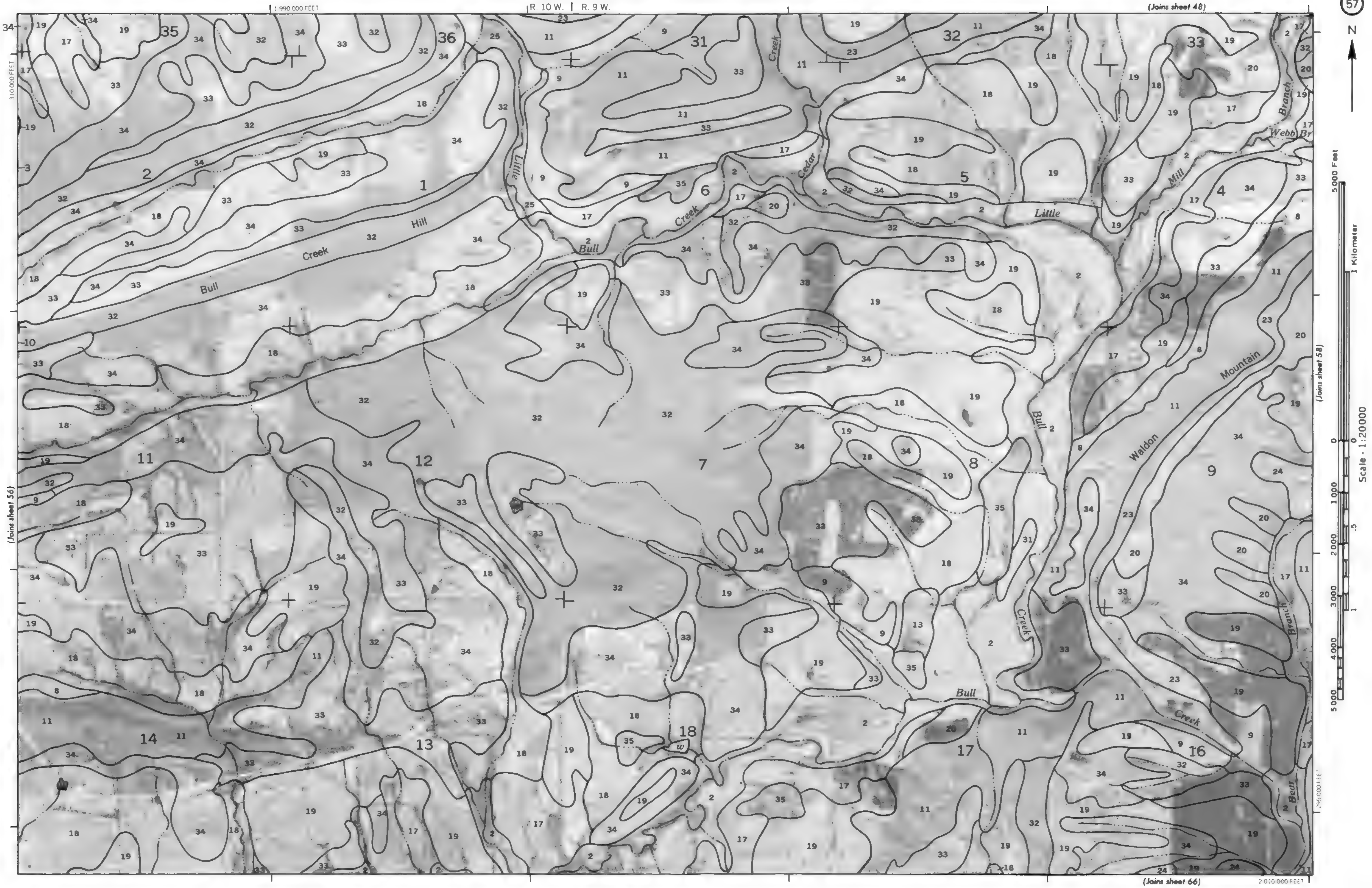
WHITE COUNTY, ARKANSAS — SHEET NUMBER 53

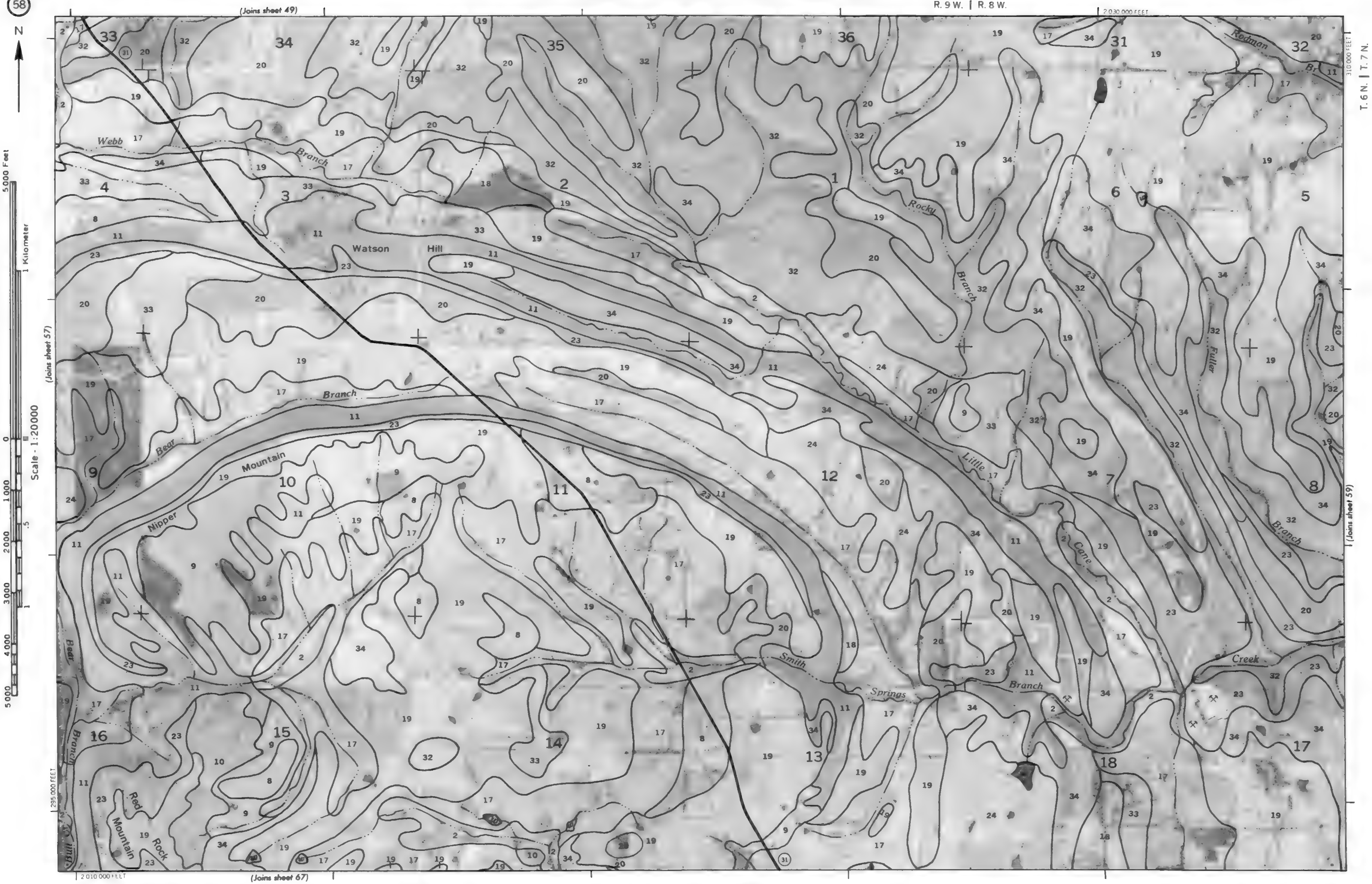
WHITE COUNTY, ARKANSAS — SHEET NUMBER 54

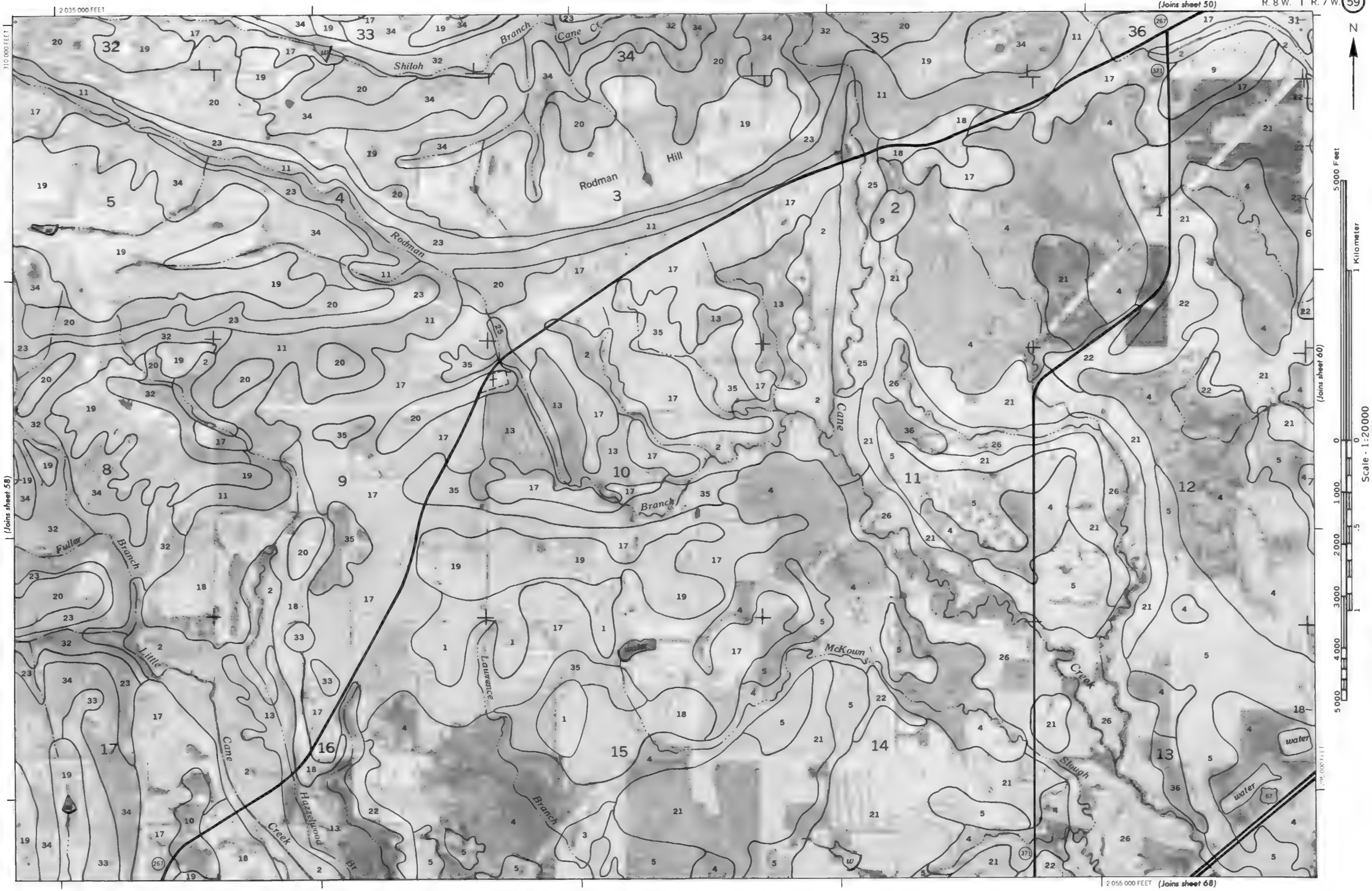


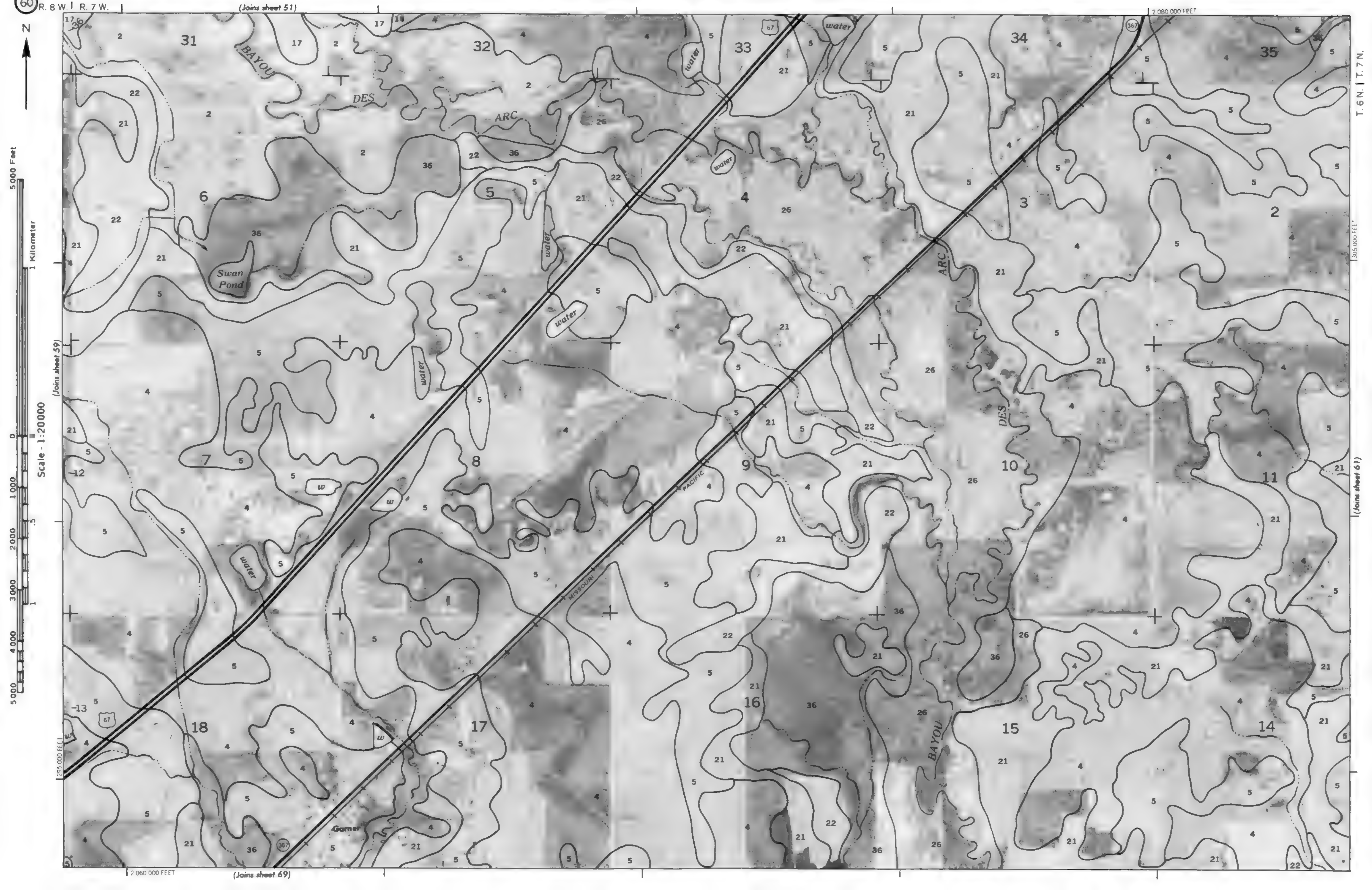

55
2 160 000 FEET
R. 4 W.
(Joins sheet 46)
325 000 FEET
T. 7 N.
(Joins sheet 54)
(Joins inset, sheet 64)
(Joins sheet 64)
310 000 FEET
2 180 000 FEET
N
5 000 Feet
1 Kilometer
Scale - 1:20000
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
Hat Lake
Little Bell Lake
Gum Pond
Big Bell Lake
Dollar Pond
Glaise Creek
Tom Slough
Little Green
Whirl Lake
Whirl Creek
Honey Lake
Mallard Pond
WHITE RIVER
LITTLE RED RIVER
WOODRUFF COUNTY
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34

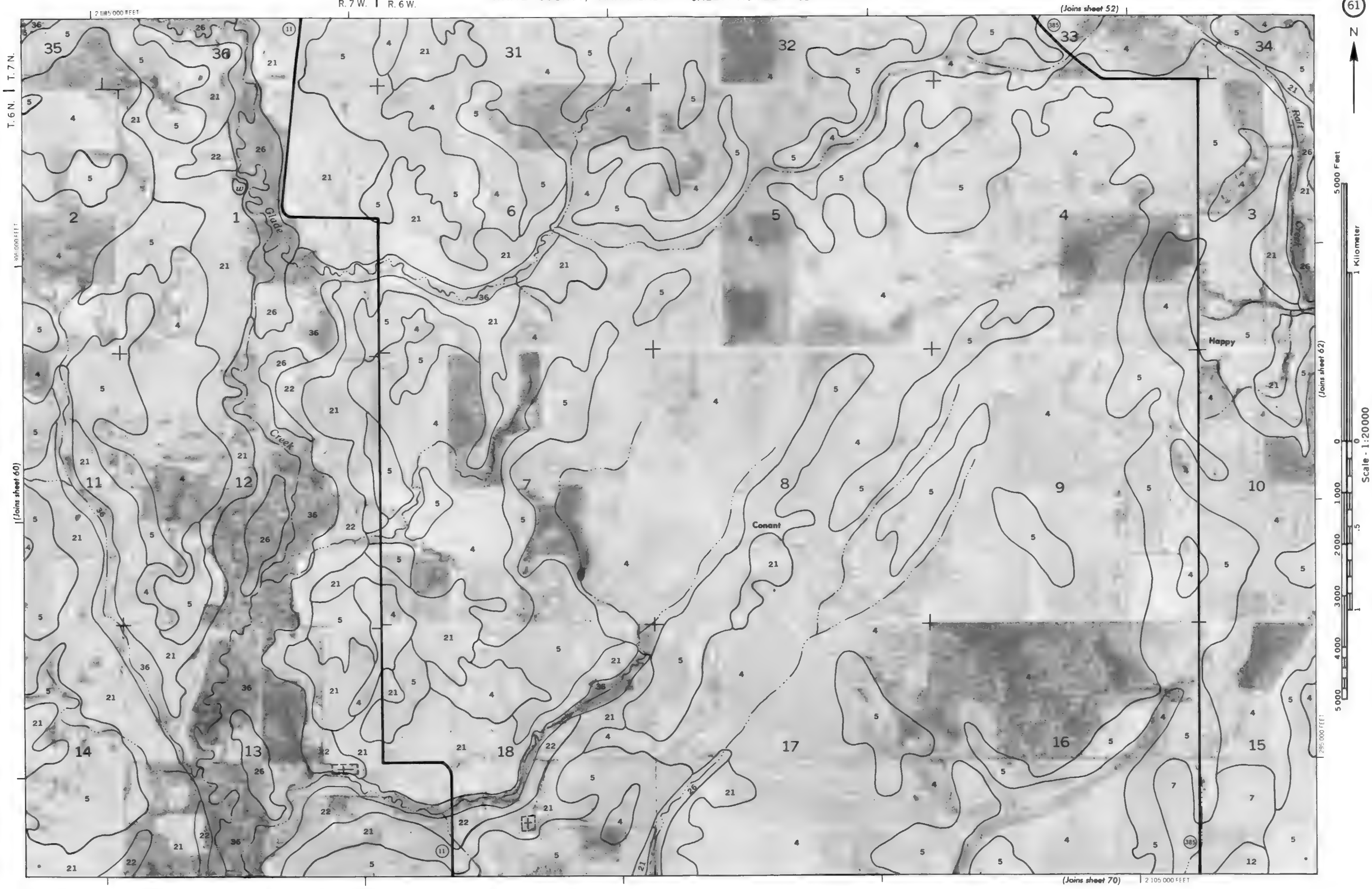

56
N
(Joins sheet 47)
(Joins sheet 65)
(Joins sheet 57)
R. 10 W.
T. 7 N.
T. 6 N.
1 985 000 FEET
1 965 000 FEET
295 000 FEET
FAULKNER COUNTY
Muddy Bayou
Little Creek
Tucker Bluff
Bull Creek
water
Scale - 1:20000
1 Kilometer
5 000 Feet

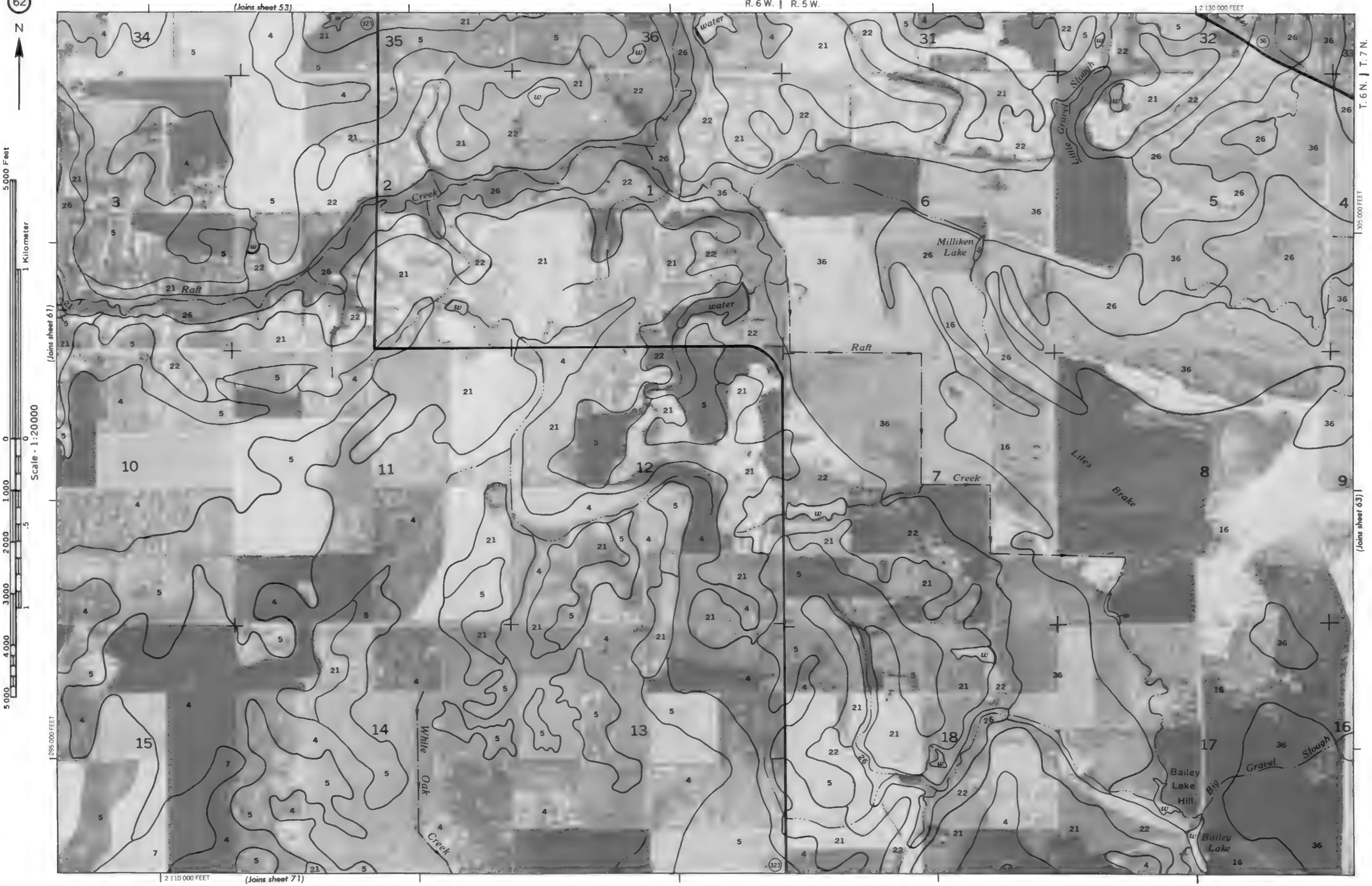

57
1 990 000 FEET
R. 10 W. | R. 9 W.
(Joins sheet 48)
T. 6 N. | T. 7 N.
310 000 FEET
(Joins sheet 56)
(Joins sheet 58)
(Joins sheet 66)
2 010 000 FEET
N
5 000 Feet
1 Kilometer
Scale - 1:20000
Bull Creek
Hill
Little Bull Creek
Cedar Creek
Little
Mill
Webb Br
Branch
Waldon Mountain
Bull Creek
Bear

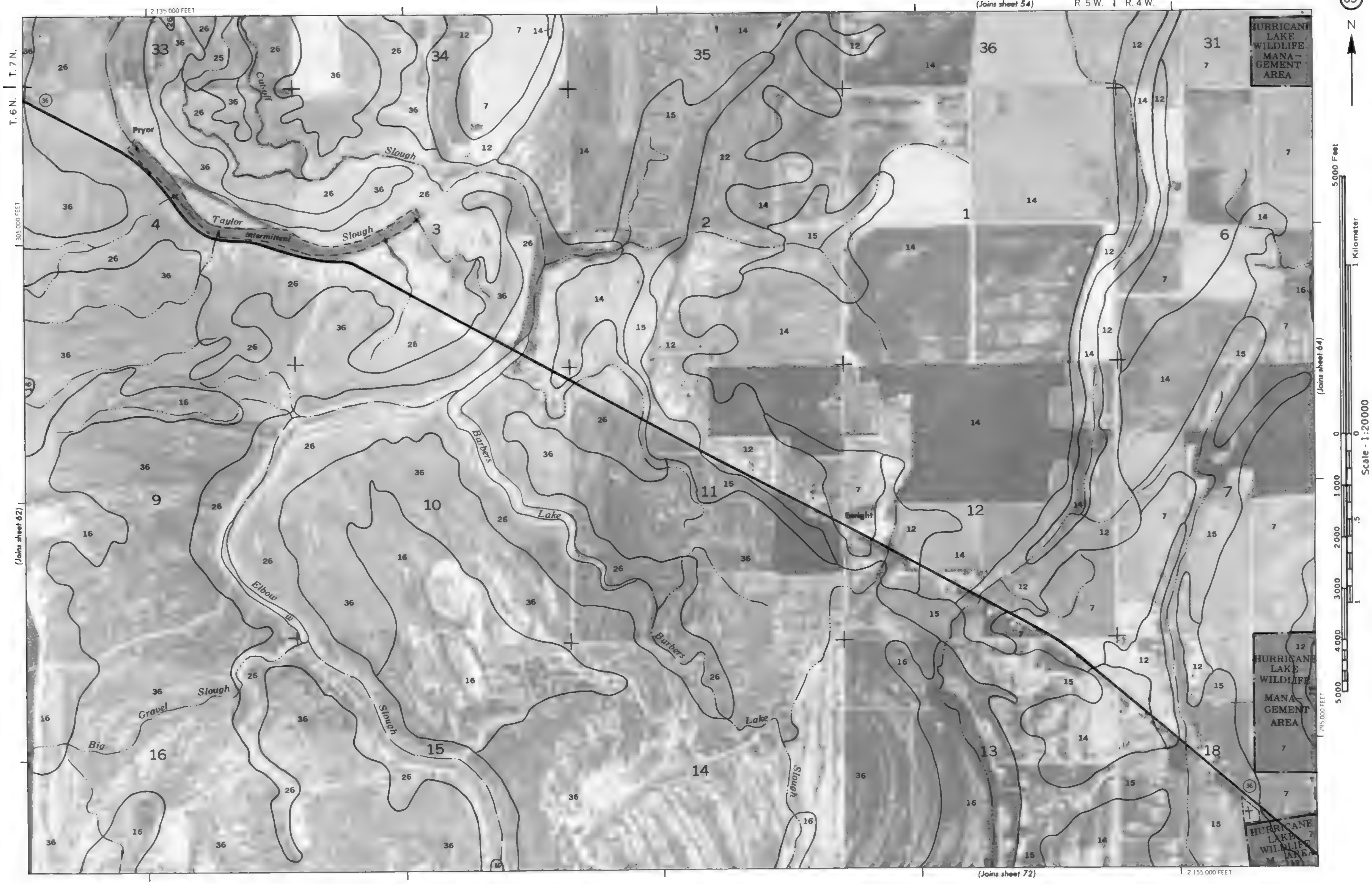

(Joins sheet 49)
R. 9 W. | R. 8 W.
2 030 000 FEET
310 000 FEET
T. 6 N. | T. 7 N.
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 67)
2 010 000 FEET
295 000 FEET
N
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
.5
1
Webb Branch
Watson Hill
Rocky Branch
Rodman Br
Bear Branch
Nipper Mountain
Little Cane
Fuller Branch
Creek
Smith Springs Branch
Bear Branch
Red Mountain Rock
Bill
31


59
R. 8 W. | R. 7 W.
T. 6 N. | T. 7 N.
2 035 000 FEET
310 000 FEET
(Joins sheet 50)
(Joins sheet 58)
(Joins sheet 60)
2 055 000 FEET (Joins sheet 68)
N
5 000 Feet
1 Kilometer
Scale 1:20000
Shiloh
Branch
Cane Cr.
Rodman
Hill
Rodman
Cane
Branch
Fuller
Branch
Little
Cane
Lawrance
McKown
Creek
Slough
Hazzelwood
Br.
Creek
Branch
water

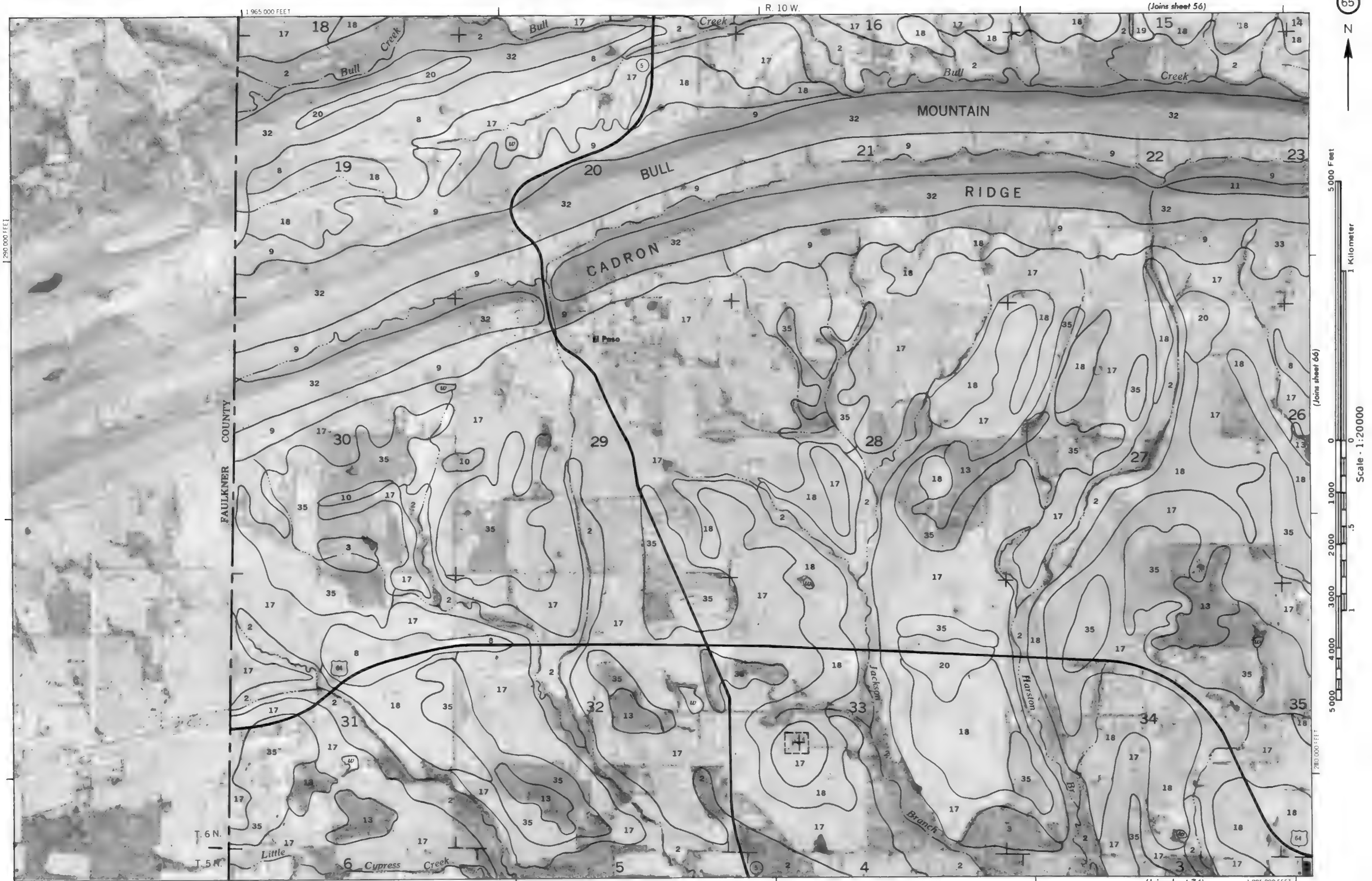

60
R. 8 W. | R. 7 W.
(Joins sheet 51)
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 69)
T. 6 N. | T. 7 N.
N
2 080 000 FEET
2 060 000 FEET
305 000 FEET
295 000 FEET
5 000 Feet
1 Kilometer
Scale - 1:20000
BAYOU
DES
ARC
Swan Pond
water
MISSOURI
PACIFIC
Garner
67
367
31
32
33
34
35
6
5
4
3
2
7
8
9
10
11
18
17
16
15
14


61
R. 7 W. | R. 6 W.
T. 7 N. | T. 6 N.
(Joins sheet 52)
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 70)
2 085 000 FEET
2 105 000 FEET
295 000 FEET
Glade Creek
Raft Creek
Happy
Conant
N
5000 Feet
1 Kilometer
Scale - 1:20000


(Joins sheet 53)
R. 6 W. | R. 5 W.
2 130 000 FEET
T. 6 N. | T. 7 N.
305 000 FEET
(Joins sheet 63)
(Joins sheet 71)
2 110 000 FEET
(Joins sheet 61)
295 000 FEET
N
5 000 Feet
1 Kilometer
Scale - 1:20000
water
Creek
Raft
Milliken Lake
Little Gravel Slough
Raft
Creek
Liles Brake
White Oak Creek
Bailey Lake Hill
Big Gravel Slough
Bailey Lake

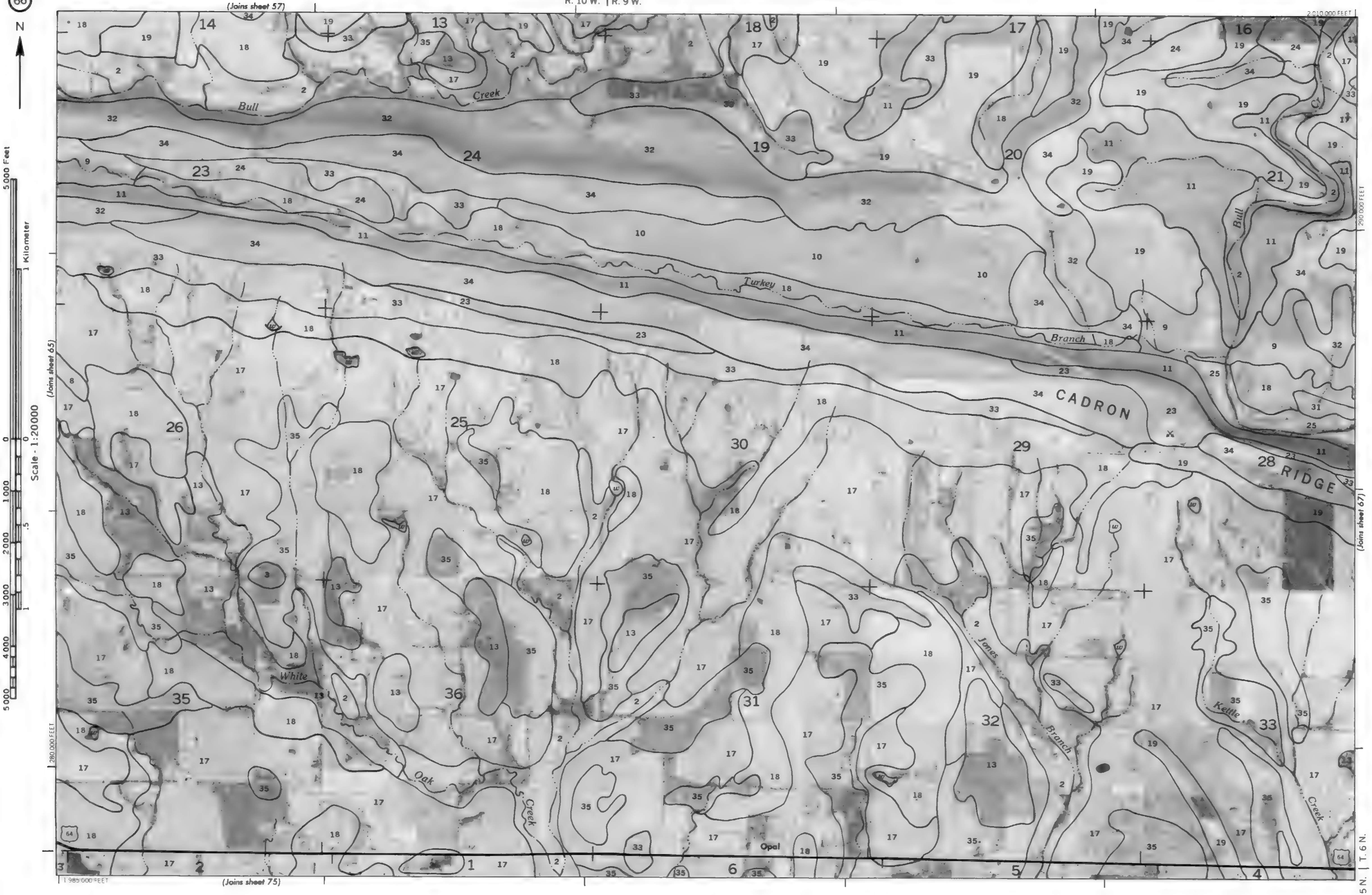

(Joins sheet 54)
R. 5 W.
R. 4 W.
T. 7 N.
T. 6 N.
2 135 000 FEET
2 155 000 FEET
305 000 FEET
295 000 FEET
(Joins sheet 62)
(Joins sheet 64)
(Joins sheet 72)
N
5 000 Feet
1 Kilometer
Scale - 1:20000
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
Pryor
Cut-off
Slough
Taylor
Intermittent
Slough
Barbers
Lake
Barbers
Lake
Slough
Elbow
Slough
Big
Gravel
Slough
33
34
35
36
31
4
3
2
1
6
9
10
11
12
7
16
15
14
13
18


N
(Joins sheet 55)
R. 4 W.
2 180 000 FEET
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
Graham Point
T. 6 N. | T. 7 N.
WHITE RIVER
WOODRUFF COUNTY
Neumann Lake
Kellum Slough
Britt Lake
Ryan Lake
water
(Joins sheet 63)
2 160 000 FEET
(Joins sheet 73)
295 000 FEET
Scale - 1:20000
5 000 Feet
1 Kilometer
R. 4 W.
(Joins inset, sheet 28)
2 185 000 FEET
Gravelly Point
325 000 FEET
305 000 FEET
315 000 FEET
(Joins sheet 55)
T. 7 N.
2 182 000 FEET
3000 AND 5000-FOOT GRID TICKS

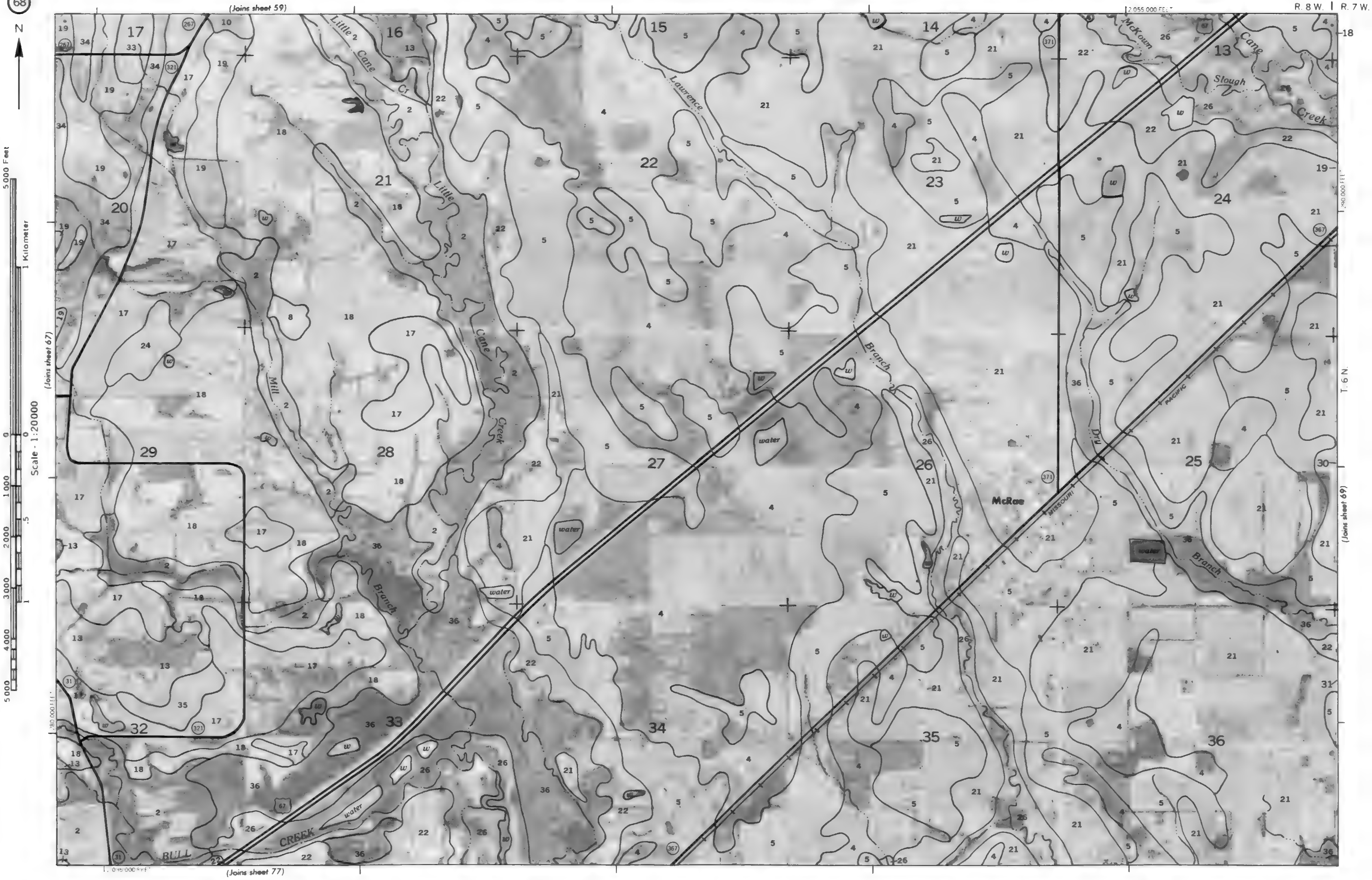

65
N
(Joins sheet 56)
1 965 000 FEET
R. 10 W.
290 000 FEET
MOUNTAIN
BULL
RIDGE
CADRON
Bull Creek
El Paso
FAULKNER COUNTY
(Joins sheet 66)
Jackson Branch
Harston Br.
Little Cypress Creek
T. 6 N.
T. 5 N.
(Joins sheet 74)
1 985 000 FEET
280 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000

(66)

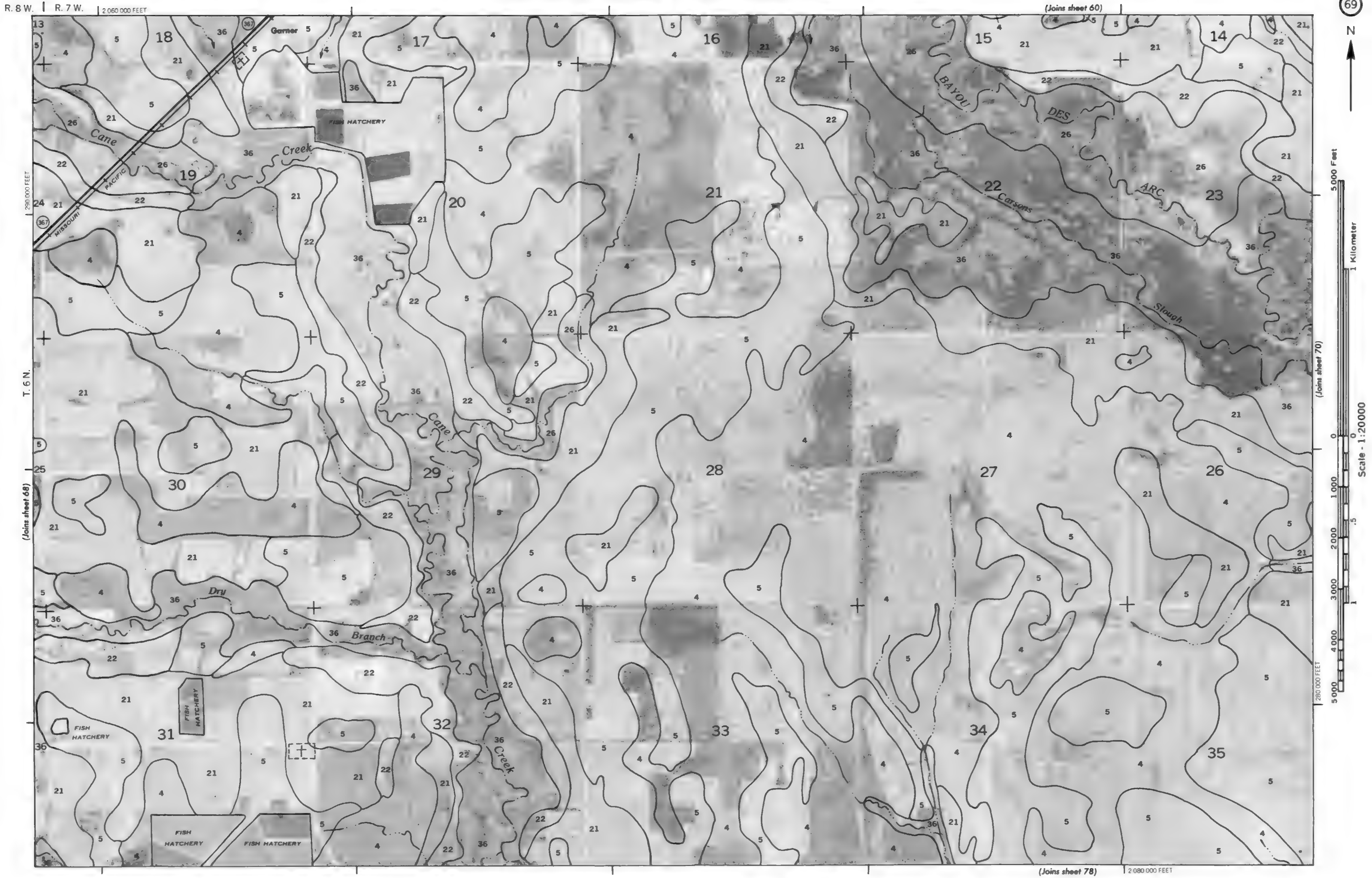
WHITE COUNTY, ARKANSAS — SHEET NUMBER 66

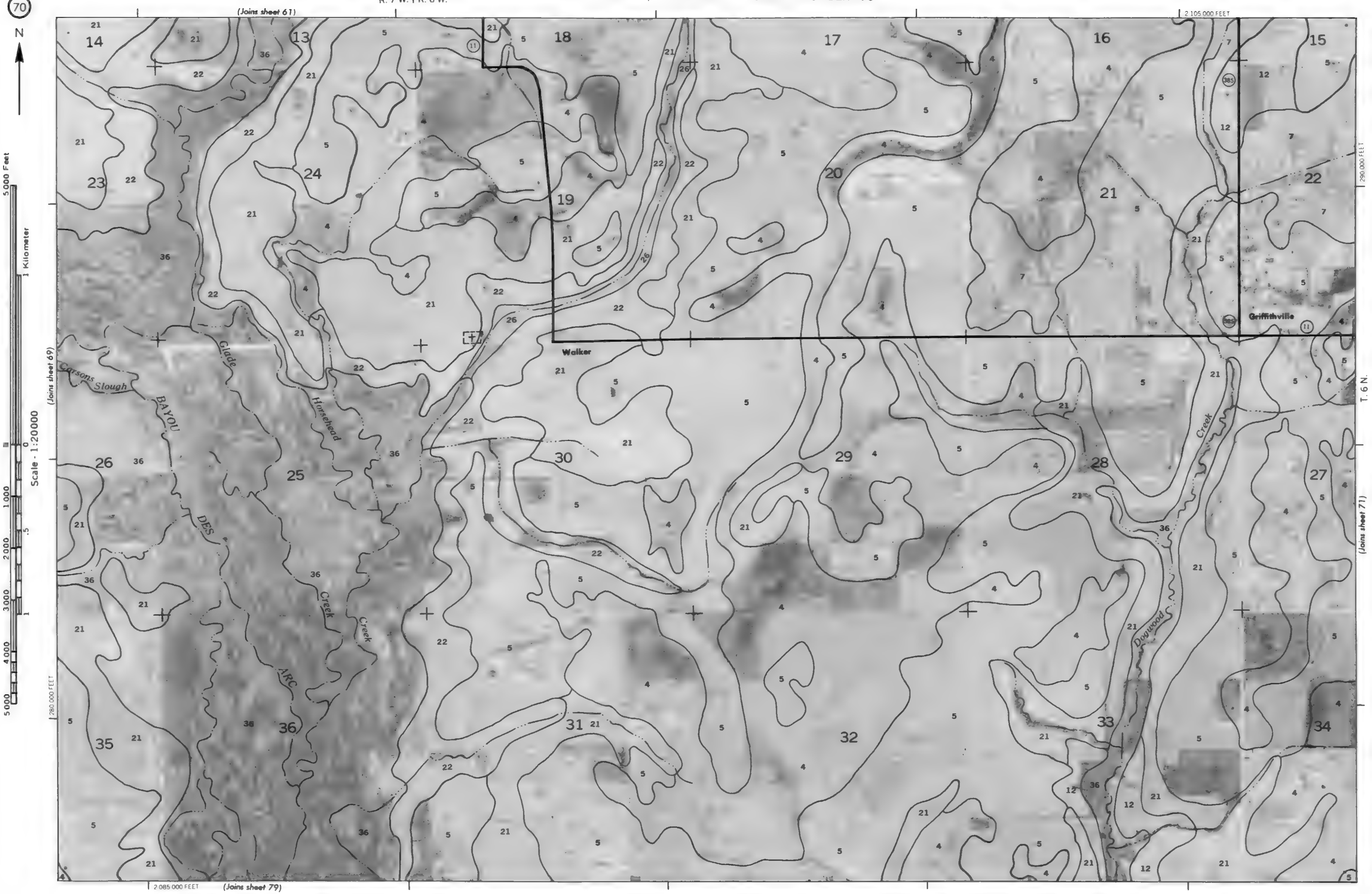



67
R. 9 W.
R. 8 W.
(Joins sheet 58)
(Joins sheet 66)
(Joins sheet 68)
(Joins sheet 76)
T. 6 N.
T. 5 N.
Red Rock Mountain
Mash Branch
Branch
Antioch
Mill Branch
CADRON RIDGE
Bull Creek
Creek
Negro Branch
Bull Creek
N
5000 Feet
1 Kilometer
Scale 1:20000

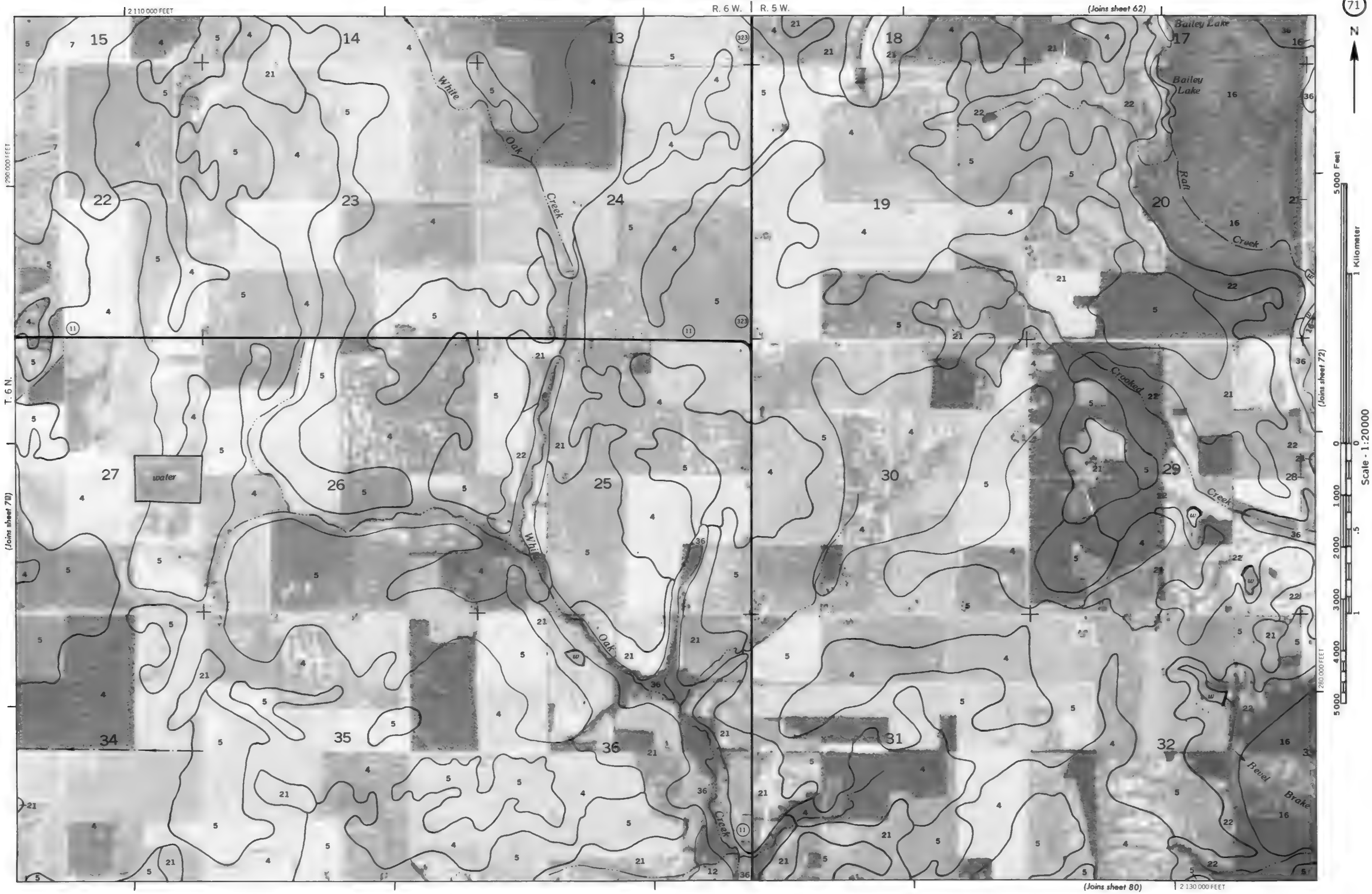

N
5 000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 59)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 77)
R. 8 W. | R. 7 W.
T. 6 N.
2 055 000 FEET
McRae
Little Cane Cr
Little Cane Creek
Mill Creek
Lawrence Branch
McKown Cane Slough Creek
Dry Branch
Branch
BULL CREEK
MISSOURI PACIFIC
water

WHITE COUNTY, ARKANSAS — SHEET NUMBER 69



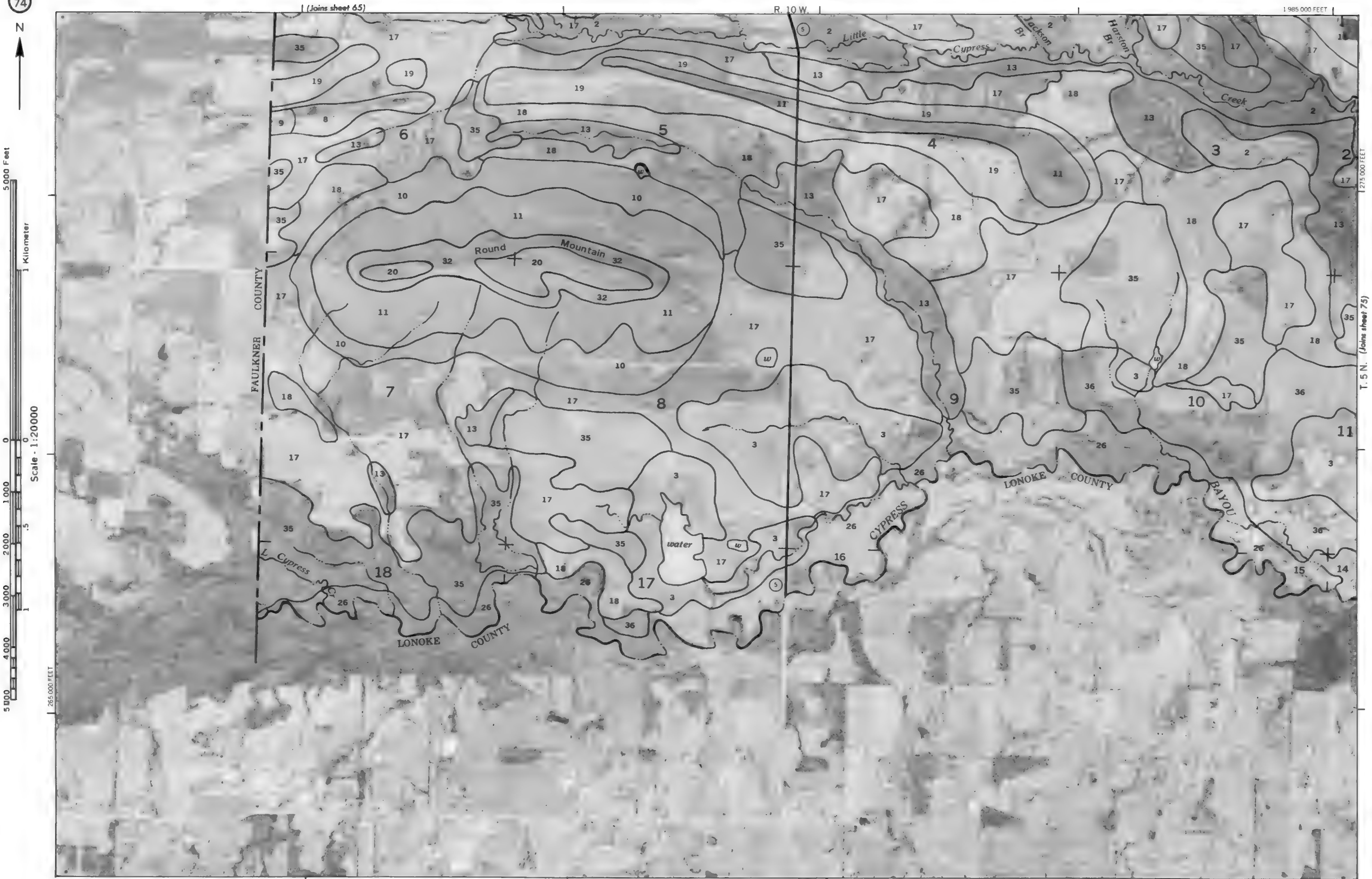

R. 7 W. | R. 6 W.
(Joins sheet 61)
(Joins sheet 69)
(Joins sheet 71)
(Joins sheet 79)
T. 6 N.
N
5 000 Feet
1 Kilometer
Scale - 1:20000
2 105 000 FEET
2 085 000 FEET
290 000 FEET
280 000 FEET
Walker
Griffithville
Carsons Slough
Glade
Horsehead Creek
BAYOU DES ARC
Creek
Dogwood Creek

WHITE COUNTY, ARKANSAS — SHEET NUMBER 71

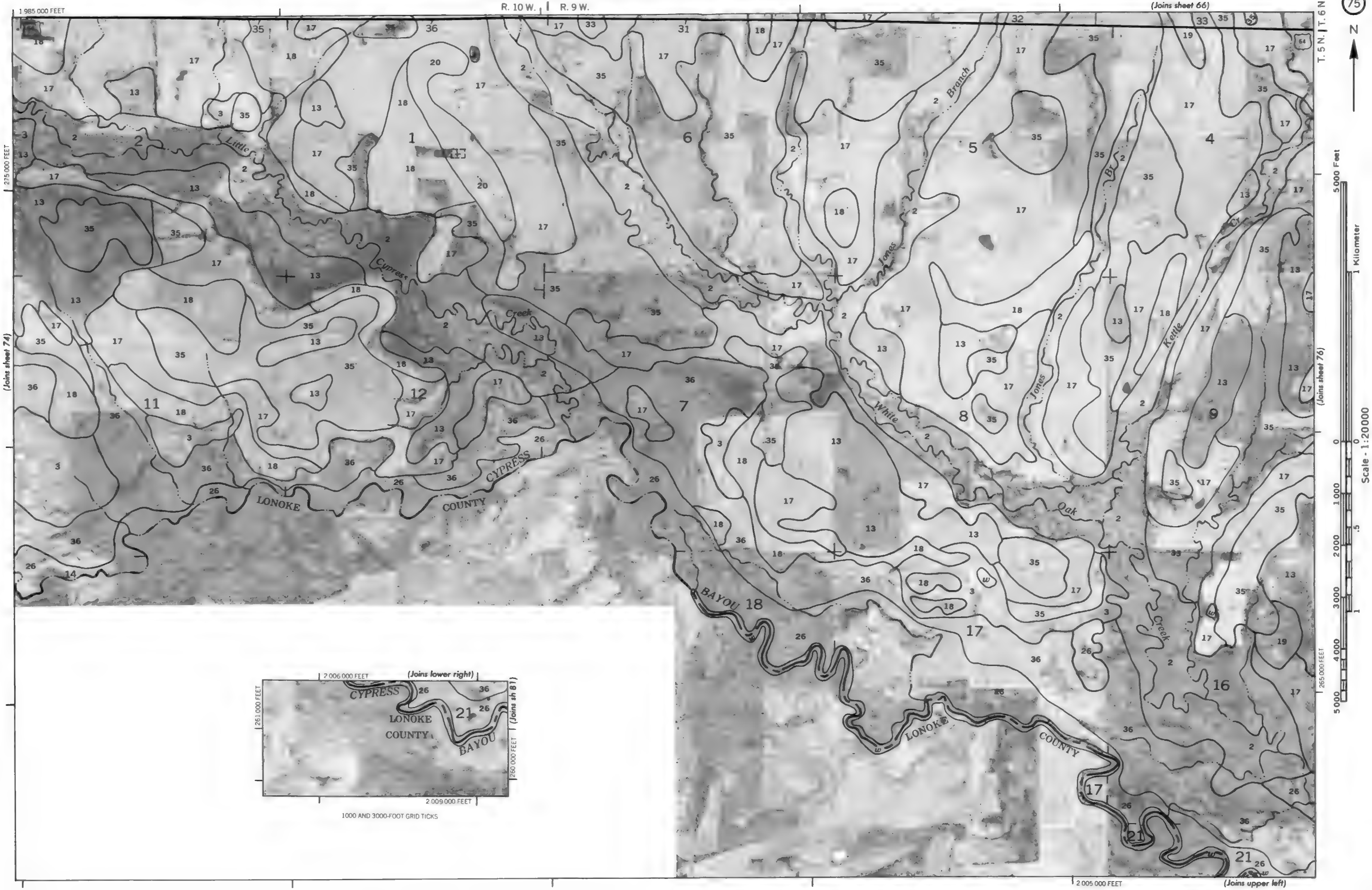


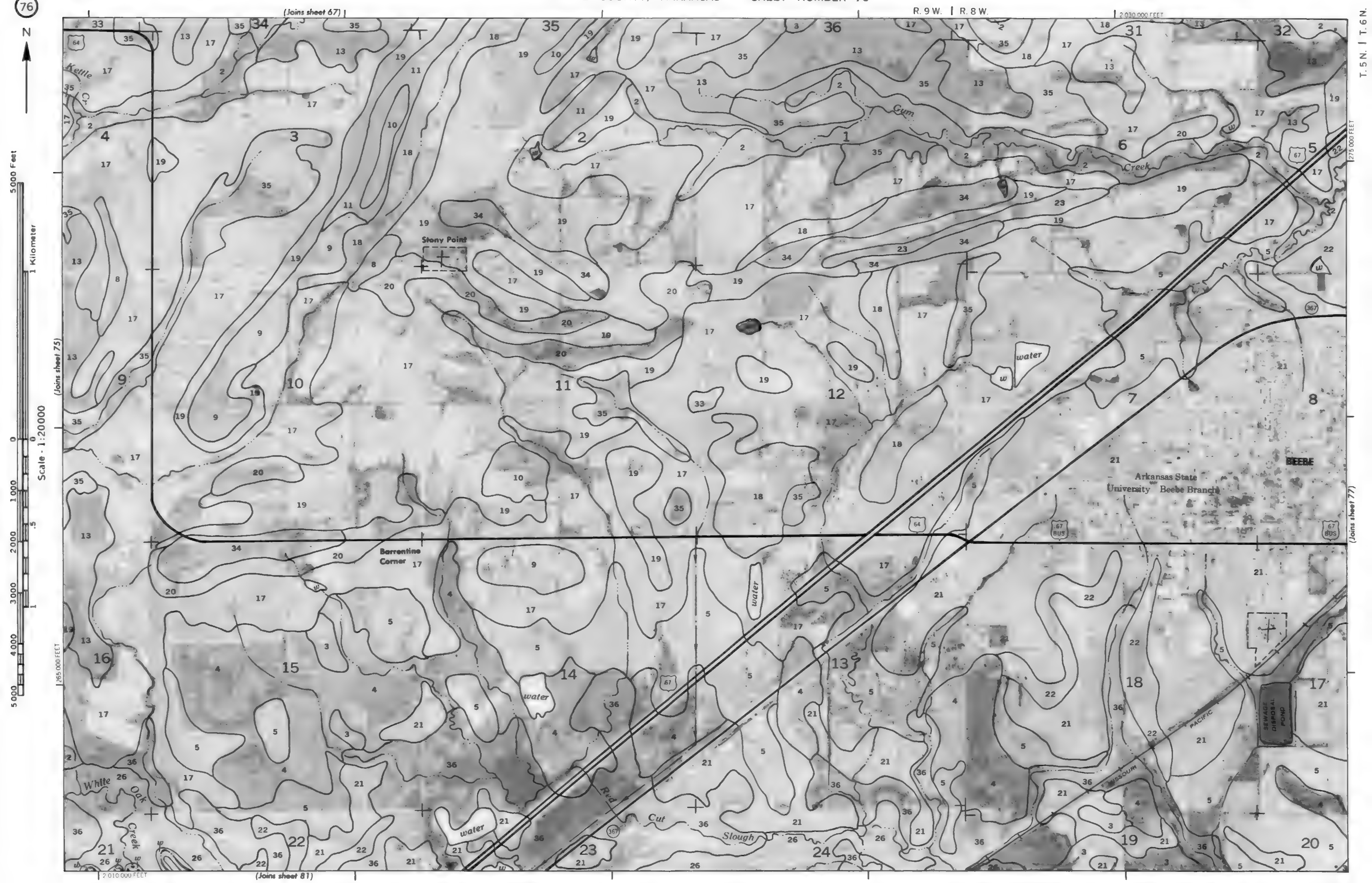

72
N
(Joins sheet 63)
R. 5 W.
R. 4 W.
2 155 000 FEET
290 000 FEET
T. 6 N.
(Joins sheet 73)
(Joins sheet 71)
280 000 FEET
2 135 000 FEET
(Joins inset, sheet 84)
5000 Feet
1 Kilometer
Scale 1:20000
0
1000
2000
3000
4000
5000
.5
1
Lost Hill
Brush Island
Barbers Lake Slough
Slough
Pond
Beaver
Elbow
Raft
Creek
Redman Lake Slough
Hacks Hill
East
Wheaton Lake
Crooked
Ct
Eagle Brake
Browns Pond
Blue Hole Branch
Bates Hill
Watkins Brake
Crooked Creek
McGhee Lake
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
33
34
35
36

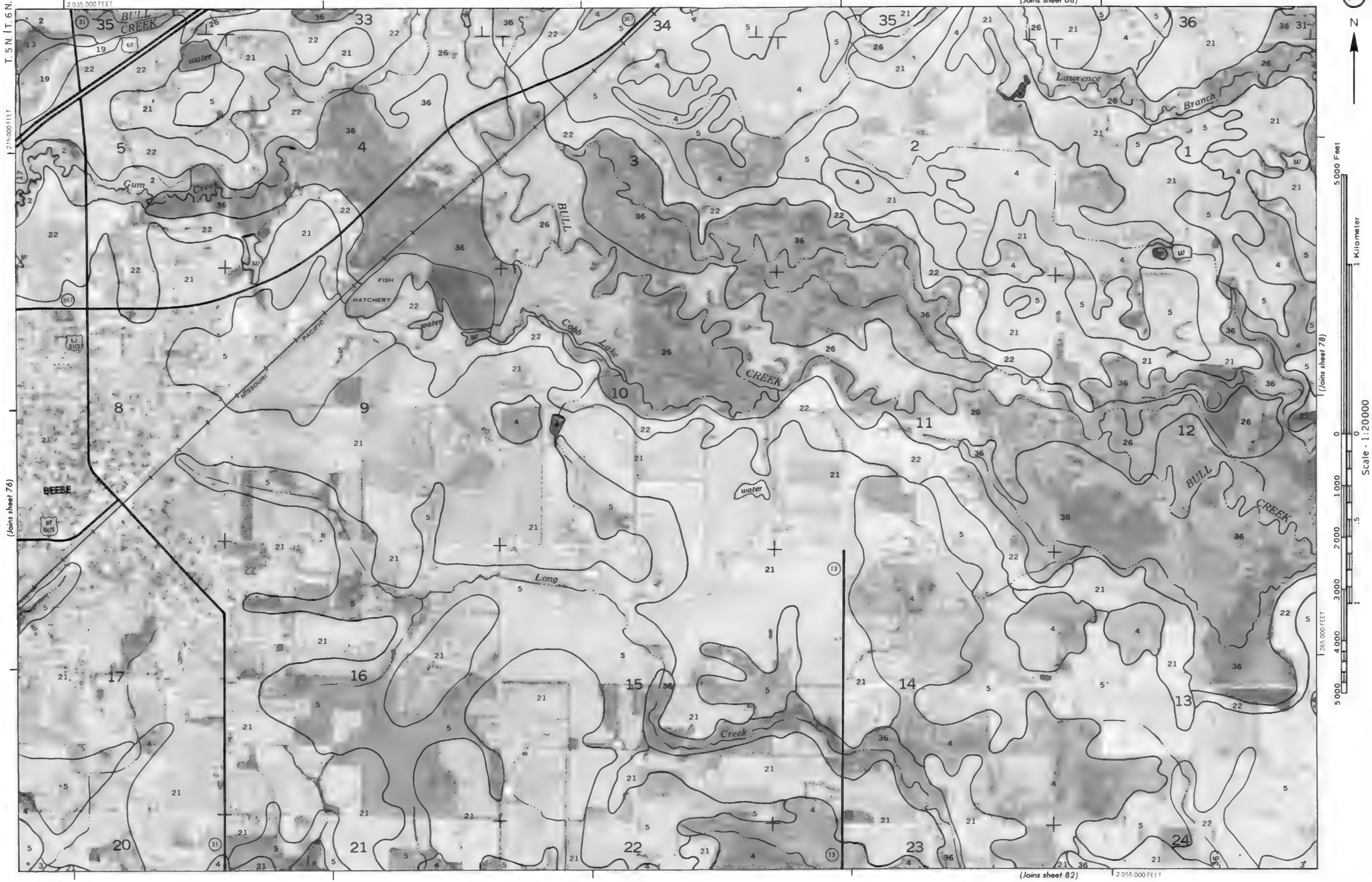
R. 4 W.
2 160 000 FEET
(Joins sheet 64)
HURRICANE LAKE WILDLIFE MANAGEMENT AREA
Georgetown
Ball Lake
Deep Bank Slough
Pigeon Slough
WHITE RIVER
WOODRUFF COUNTY
T. 6 N.
290 000 FEET
(Joins sheet 72)
(Joins upper right)
280 000 FEET
2 180 000 FEET
R. 4 W.
2 160 000 FEET
(Joins lower left)
276 000 FEET
275 000 FEET
PRAIRIE COUNTY
WOODRUFF CO
water
2 165 000 FEET
1000 AND 5000-FOOT GRID TICKS
N
5000 Feet
1 Kilometer
Scale - 1:20000

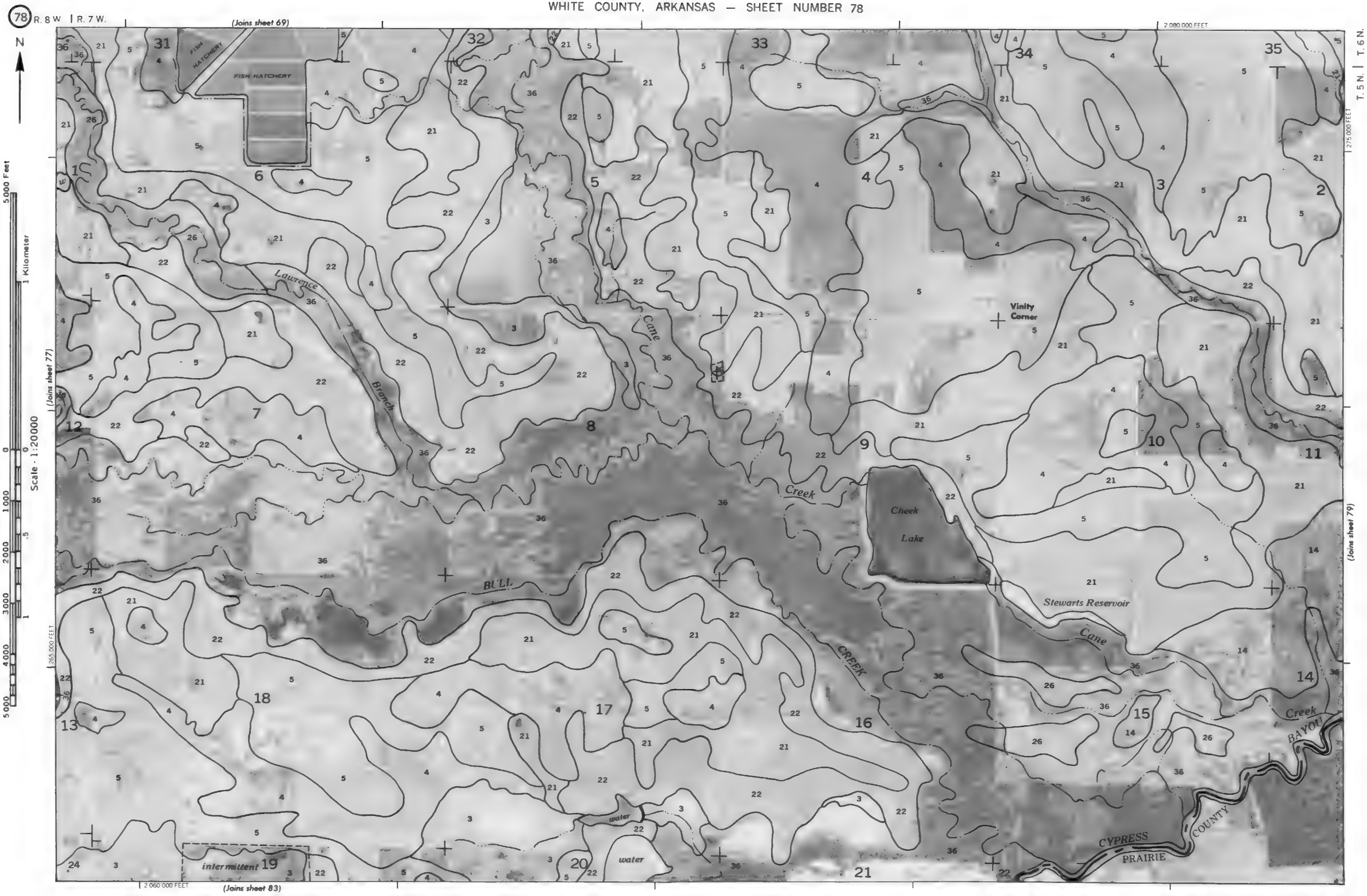

N
(Joins sheet 65)
R. 10 W.
1 985 000 FEET
275 000 FEET
T. 5 N.
(Joins sheet 75)
265 000 FEET
1 965 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000
FAULKNER COUNTY
LONOKE COUNTY
LONOKE COUNTY
Round Mountain
Little Cypress
Jackson Br
Harston Br
Creek
CYPRESS
BAYOU
L. Cypress
water

WHITE COUNTY, ARKANSAS — SHEET NUMBER 75

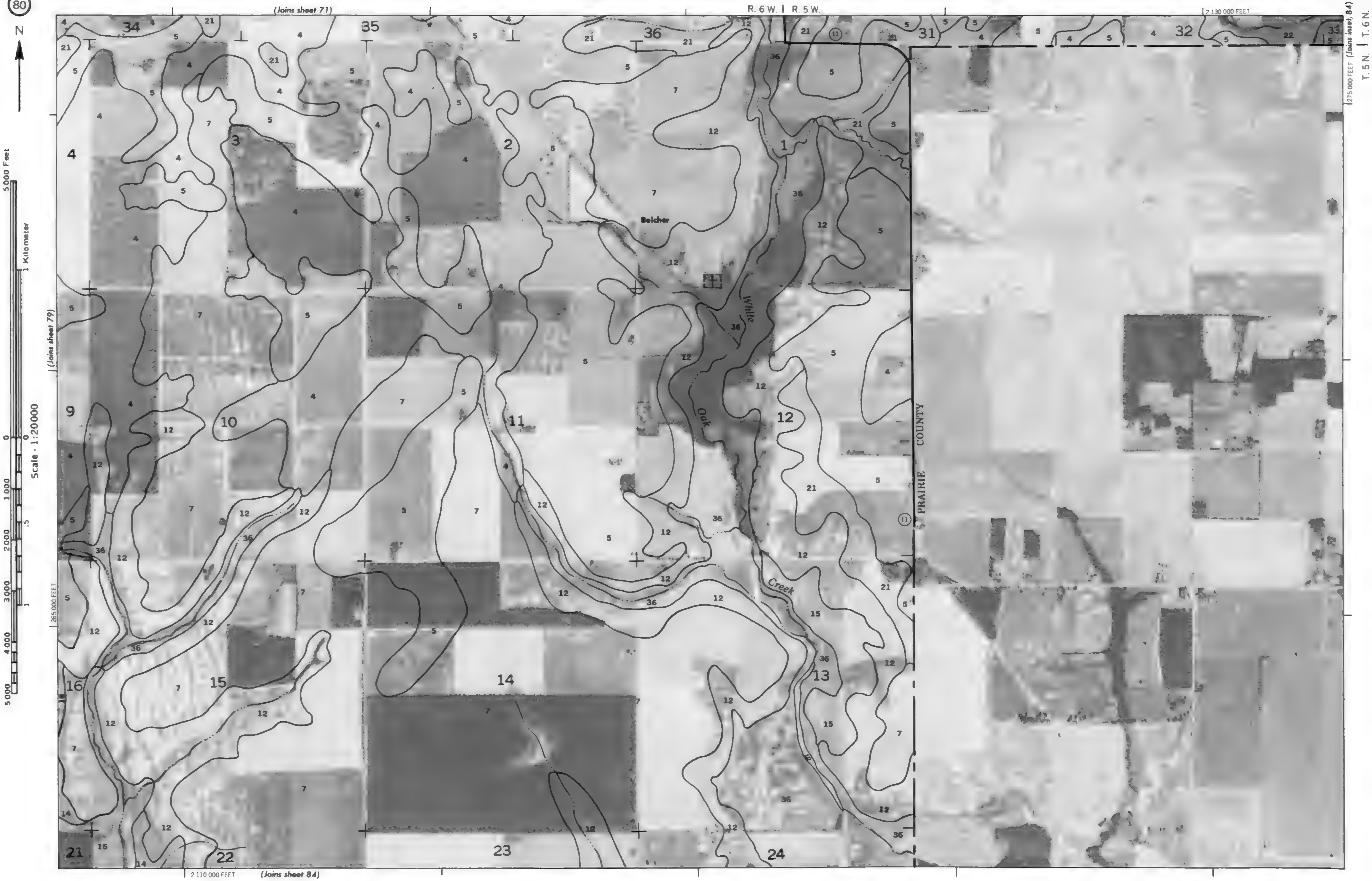


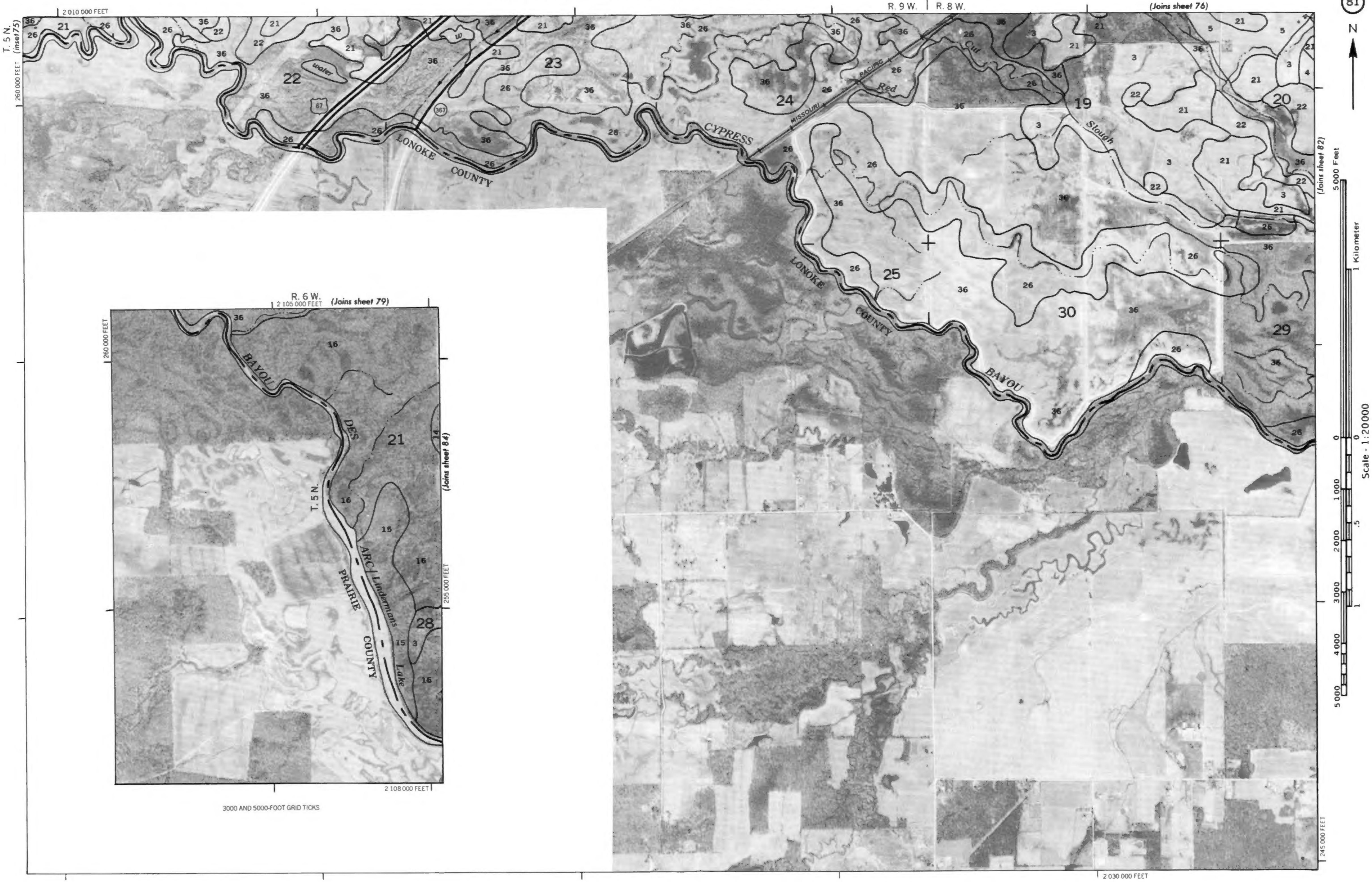

N
(Joins sheet 67)
R. 9 W. | R. 8 W.
T. 5 N. | T. 6 N.
2 030 000 FEET
275 000 FEET
265 000 FEET
2 010 000 FEET
(Joins sheet 75)
(Joins sheet 77)
(Joins sheet 81)
Kettle Cr.
Cypress Creek
Stony Point
Barrentine Corner
water
Arkansas State University Beebe Branch
BEEBE
Red Cut Slough
White Oak Creek
MISSOURI PACIFIC
SEWAGE DISPOSAL POND
Scale - 1:20000
5000 Feet
1 Kilometer

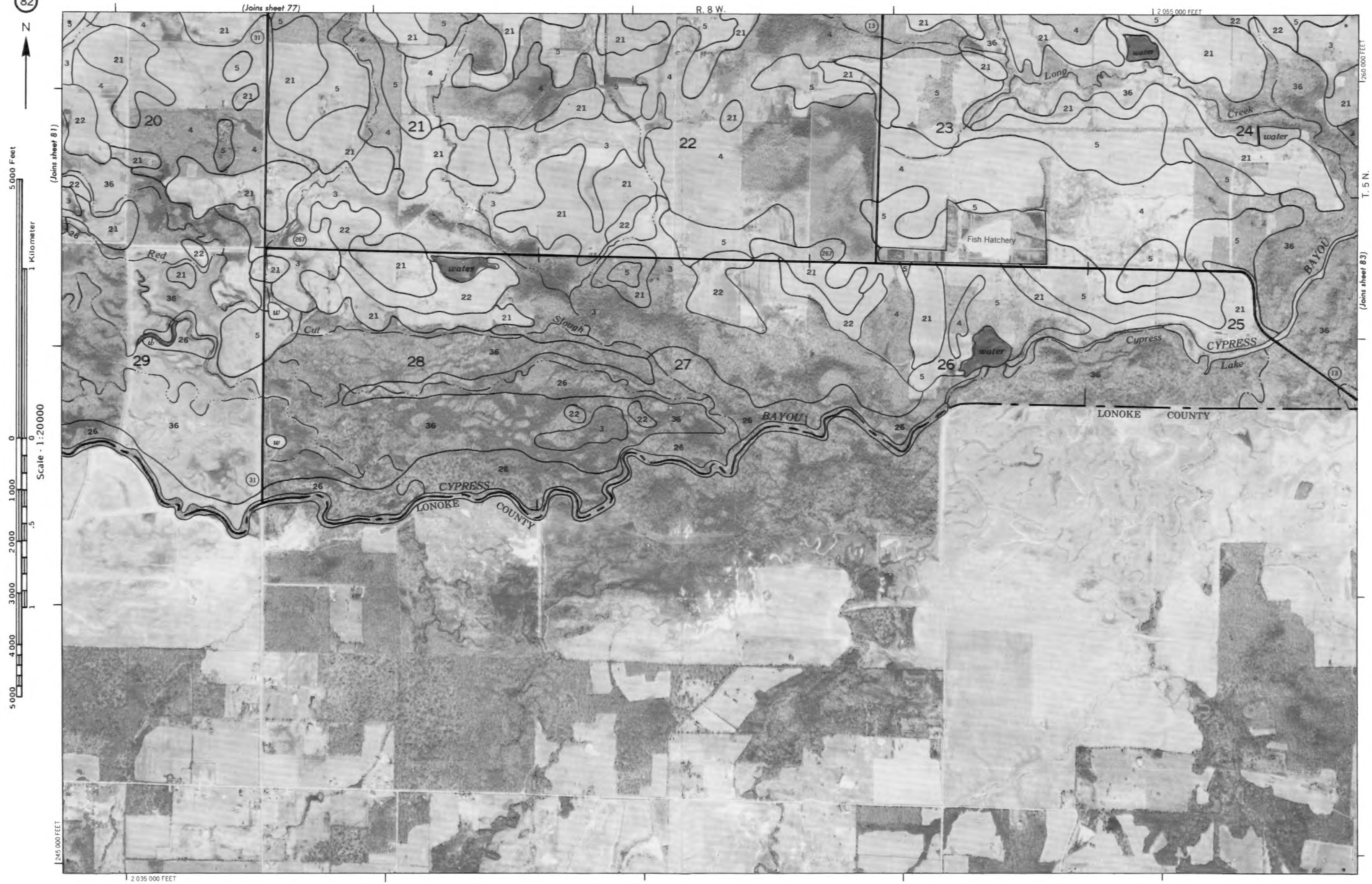

(Joins sheet 68)
(Joins sheet 76)
(Joins sheet 78)
(Joins sheet 82)
T. 5 N. | T. 6 N.
R. 8 W. | R. 7 W.
77
N
2 035 000 FEET
2 055 000 FEET
275 000 FEET
265 000 FEET
BULL CREEK
Gum Creek
Cobb Lake
CREEK
Laurence Branch
Long Creek
MISSOURI PACIFIC
FISH HATCHERY
BEEBE
water
Scale - 1:20000
5000 Feet
1 Kilometer

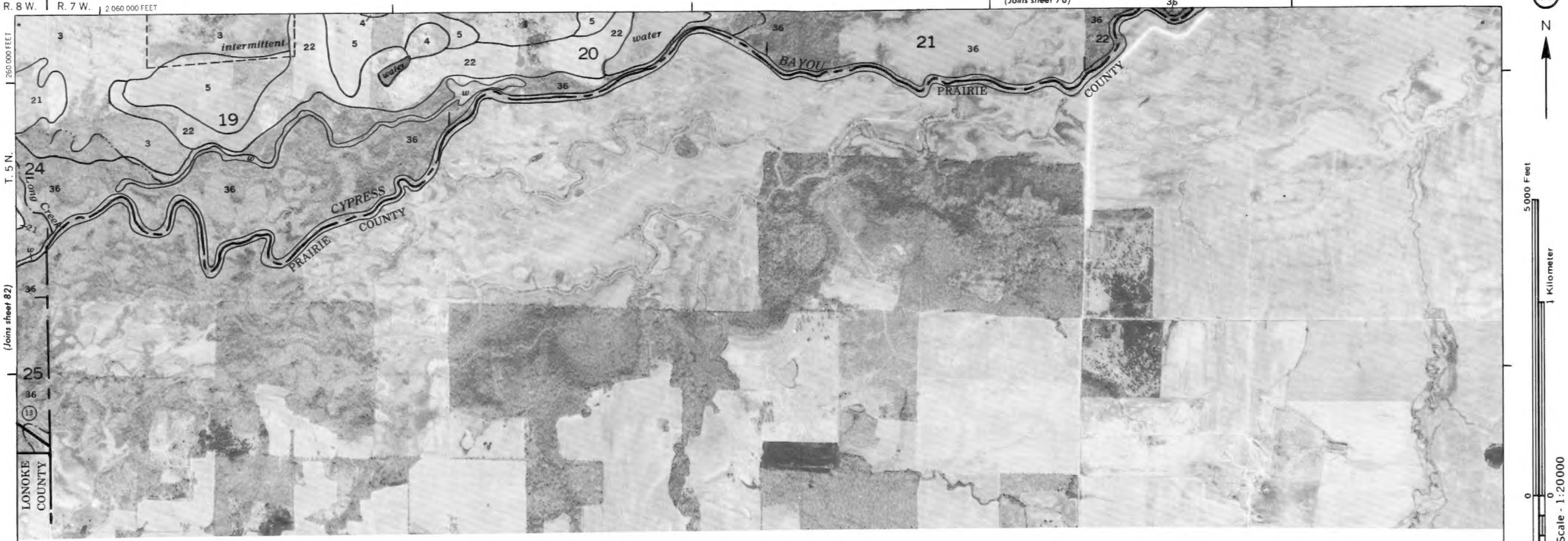

78
R. 8 W.
R. 7 W.
(Joins sheet 69)
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 83)
N
T. 6 N.
T. 5 N.
2 080 000 FEET
275 000 FEET
265 000 FEET
2 060 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000
FISH HATCHERY
FISH HATCHERY
Lawrence
Branch
Cane
Creek
Vinity Corner
Cheek Lake
Stewarts Reservoir
BULL
CREEK
Cane
Creek
BAYOU
COUNTY
CYPRESS
PRAIRIE
intermittent
water
water

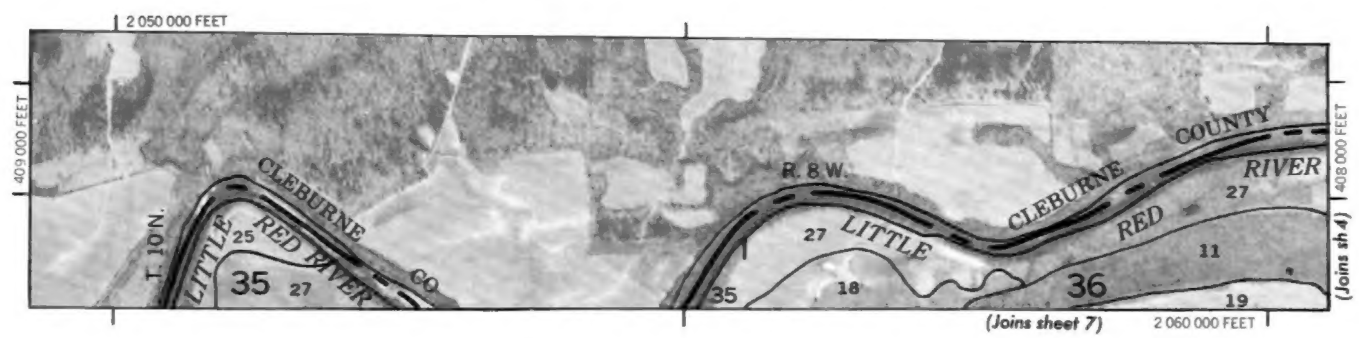

R. 7 W. | R. 6 W.
2 085 000 FEET
(Joins sheet 70)
79
N
T. 5 N. | T. 6 N.
275 000 FEET
(Joins sheet 78)
(Joins sheet 80)
265 000 FEET
2 105 000 FEET (Joins inset, sheet 81)
BAYOU DES ARC
Dogwood Creek
PRAIRIE COUNTY
CYPRESS BAYOU
5000 Feet
1 Kilometer
Scale - 1:20000
int


N
5000 Feet
1 Kilometer
Scale - 1:20000
(Joins sheet 71)
R. 6 W. | R. 5 W.
2 130 000 FEET
T. 6 N. | T. 5 N.
275 000 FEET
(Joins inset, 84)
(Joins sheet 79)
265 000 FEET
2 110 000 FEET
(Joins sheet 84)
Belcher
White Oak Creek
PRAIRIE COUNTY


N
2 010 000 FEET
R. 9 W.
R. 8 W.
(Joins sheet 76)
T. 5 N. (inset75)
260 000 FEET
water
LONOKE COUNTY
CYPRESS
MISSOURI PACIFIC
Red Cut
Slough
LONOKE COUNTY BAYOU
(Joins sheet 82)
R. 6 W.
2 105 000 FEET
(Joins sheet 79)
260 000 FEET
BAYOU DES ARC
T. 5 N.
(Joins sheet 84)
255 000 FEET
PRAIRIE COUNTY
Lindermans Lake
2 108 000 FEET
3000 AND 5000-FOOT GRID TICKS
245 000 FEET
2 030 000 FEET
5000 Feet
1 Kilometer
Scale - 1:20000


(Joins sheet 77)
R. 8 W.
2 055 000 FEET
260 000 FEET
T. 5 N.
(Joins sheet 81)
(Joins sheet 83)
N
5 000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
0
.5
1
Fish Hatchery
water
Long
Creek
Red
Cut
Slough
BAYOU
CYPRESS
Cypress
Lake
LONOKE
COUNTY
245 000 FEET
2 035 000 FEET





1000 AND 5000-FOOT GRID TICKS

WHITE COUNTY, ARKANSAS — SHEET NUMBER 84